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REFERENCE: R-5703

PROJECT: 46375

SEE SHEET 3 FOR PLAN SHEET LAYOUT  
AT TIME OF INVESTIGATION

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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

ROADWAY  
SUBSURFACE INVESTIGATION

COUNTY LENOIR

PROJECT DESCRIPTION C.F. HARVEY PARKWAY AND NC 58  
TO INTERSECTION OF NC 11 AND GRAINGER STATION RD.  
GRADING, PAVING, DRAINAGE, STRUCTURES AND SIGNALS.

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5703	1	368

CAUTION NOTICE

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  - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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SUBMITTED BY S&ME, INC.

DATE AUGUST 2017



SIGNATUREDATE

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS									
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.										HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: <div><div>WEATHERED ROCK (WR)</div><div></div><div>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</div></div> <div><div>CRYSTALLINE ROCK (CR)</div><div></div><div>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</div></div> <div><div>NON-CRYSTALLINE ROCK (NCR)</div><div></div><div>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</div></div> <div><div>COASTAL PLAIN SEDIMENTARY ROCK (CP)</div><div></div><div>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</div></div>										ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.									
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION										WEATHERING																			
GENERAL CLASS. GRANULAR MATERIALS (< 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.																			
GROUP CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-4 A-5 A-6 A-7 A-1, A-2 A-3 A-4, A-5 A-6, A-7										SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50										VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED. SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.																			
SYMBOL										PERCENTAGE OF MATERIAL										SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.																			
Z PASSING #10 #40 #200										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL										MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.																			
MATERIAL PASSING #40										GROUND WATER										MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL																			
LL PL										MISCELLANEOUS SYMBOLS										SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF																			
GROUP INDEX										RECOMMENDATION SYMBOLS										VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF																			
USUAL TYPES OF MAJOR MATERIALS										ABBREVIATIONS										COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.																			
GEN. RATING AS SUBGRADE										EQUIPMENT USED ON SUBJECT PROJECT																													
PI OF A-7-5 SUBGROUP IS < LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30										DRILL UNITS:																													
CONSISTENCY OR DENSENESS										ADVANCING TOOLS:																													
PRIMARY SOIL TYPE										HAMMER TYPE:																													
COMPACTNESS OR CONSISTENCY										CORE SIZE:																													
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)										HAND TOOLS:																													
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )																																							
GENERALY GRANULAR MATERIAL (NON-COHESIVE)																																							
GENERALY SILT-CLAY MATERIAL (COHESIVE)																																							
TEXTURE OR GRAIN SIZE																																							
U.S. STD. SIEVE SIZE OPENING (MM)																																							
BOULDER (BLD.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)																																							
GRAIN SIZE																																							
SOIL MOISTURE - CORRELATION OF TERMS																																							
SOIL MOISTURE SCALE (ATTERBERG LIMITS)																																							
FIELD MOISTURE DESCRIPTION																																							
GUIDE FOR FIELD MOISTURE DESCRIPTION																																							
LL LIQUID LIMIT																																							
PLASTIC RANGE (PI)																																							
PL PLASTIC LIMIT																																							
OM OPTIMUM MOISTURE																																							
SL SHRINKAGE LIMIT																																							
PLASTICITY																																							
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC																																							
COLOR																																							
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.																																							

09/08/99

See Sheet 1-A For Index of Sheets

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

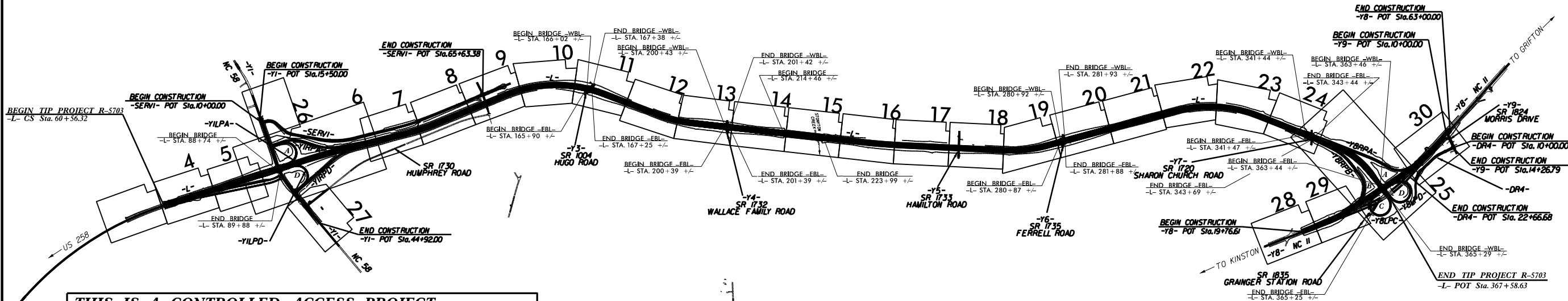
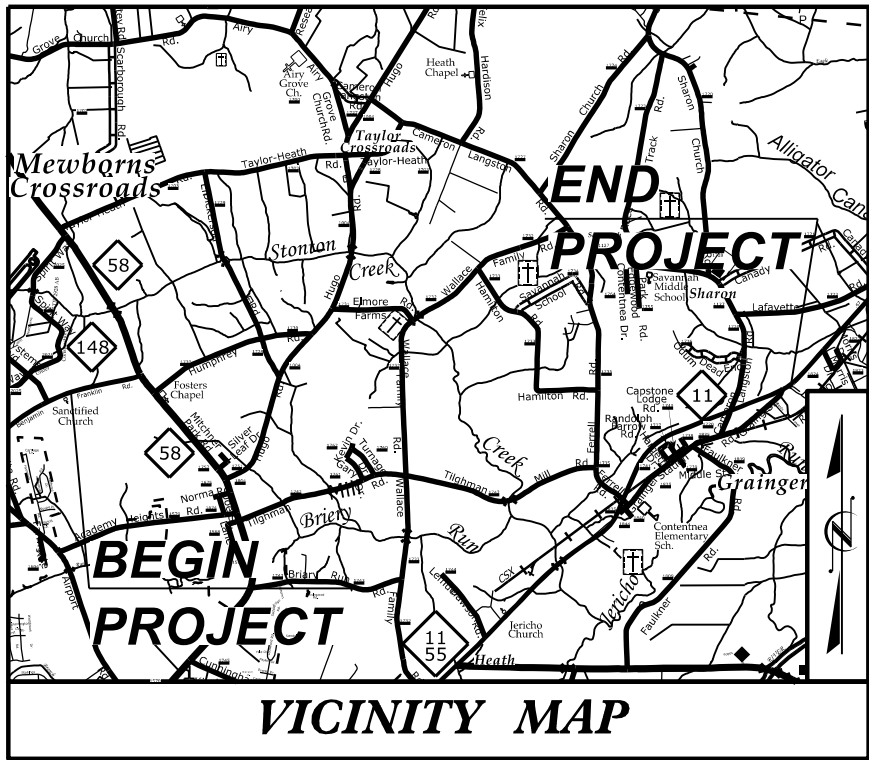
LENOIR COUNTY

LOCATION: FROM THE INTERSECTION OF C.F. HARVEY PARKWAY  
AND NC 58 TO INTERSECTION OF NC 11 AND GRAINGER STATION RD.

TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURES AND SIGNALS.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5703	3	368
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46375.1.1		PE	
46375.2.1		R/W	

TIP PROJECT: R-5703

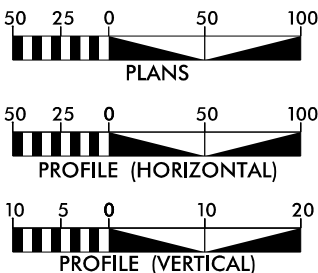


THIS IS A CONTROLLED ACCESS PROJECT  
WITH ACCESS BEING LIMITED TO INTERCHANGES.  
CLEARING ON THIS PROJECT SHALL BE PERFORMED  
TO THE LIMITS ESTABLISHED BY METHOD III.  
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL  
BOUNDARIES.

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION  
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

CONTRACT:

GRAPHIC SCALES



DESIGN DATA

ADT 2017 = 4,000  
ADT 2040 = 18,800  
K = 9 %  
D = 55 %  
T = 8 % \*  
V = 70 MPH  
\* TTST = 4% DUAL 4%  
FUNC CLASS =  
FREEWAY/INTERSTATE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5703 = 5.450 MILES  
LENGTH STRUCTURE TIP PROJECT R-5703 = 0.338 MILES  
TOTAL LENGTH TIP PROJECT R-5703 = 5.788 MILES

Prepared In the Office of:

Michael Baker

Michael Baker International, Inc.  
8000 Regency Parkway, Suite 600  
Cary, NC 27518  
Professional Corporation License Number  
F-1084

FOR  
DIVISION OF HIGHWAYS

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
FEBRUARY 6, 2017

LETTING DATE:  
DECEMBER 20, 2017

TODD BUCKNER, P.E.  
PROJECT ENGINEER

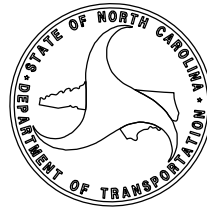
SUSAN LANCASTER, P.E.  
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN  
ENGINEER

SIGNATURE: P.E.



August 29, 2017

STATE PROJECT: 46375.1.1  
STIP NUMBER: R-5703  
COUNTY: Lenoir  
DESCRIPTION: C.F. Harvey Parkway and NC58 to intersection of NC 11 and Grainger Station  
Road grading, paving, drainage, structures and signals.  
  
SUBJECT: Geotechnical Report - Inventory

Project Description

The project is part of the Felix Harvey Parkway along new alignment between NC58 and NC11 in Lenoir County, North Carolina (60+56.32 to 367+58.63 -L-). The total length of the project is 5.788 miles. Based on our review of roadway cross sections, embankment fill heights of up to 32 feet are anticipated with maximum cut depths of approximately 10 feet proposed. The project will also include improvements to multiple intersections along the alignment. The alignments investigated include -Y1-, -Y1RPA-, -Y1LPA-, -Y1LPD-, -Y1RPD-, -Y8-, -Y8RPA-, -Y8RPB-, -Y8LPC-, -Y8LPD-, -Y9- -DR4-, and -SERV1-. In addition to these alignments the following seven bridge locations along -L- were investigated: STA 89+28.52, STA 166+72.51, STA 200+91.89, STA 219+22.38, STA 281+39.19, STA 342+97.24 and STA 364+28.98. The following culvert location along -L- was also investigated: STA 67+55.46.

S&ME drilled a total of 252 soil test borings and CPT soundings as shown on Sheets 4 through 30 between August 2, 2016 and November 17, 2016 to explore the general subsurface conditions at the project site. The borings locations were selected and located in the field by S&ME personnel using a handheld Global Positioning System (GPS) unit.

Six drill rigs were used to complete the project. Two ATV mounted CME-550’s; a track mounted BK-51; an ATV mounted CME-750; a track mounted Diedrich D-50; and a Diedrich D-25 mounted on multiple carriers including a swamp buggy, were used to advance the borings. Both hollow-stem, continuous flight augers and mud rotary drilling techniques were used. Standard Penetration Tests (SPT tests) were performed at designated intervals in the soil test borings in general accordance with ASTM D1586 to provide an index for estimating soil strength and density and to provide samples for soil classification. SPT tests were performed with a hydraulic automatic hammer (Autohammer). In addition, Cone Penetration Test (CPT) testing was performed to supplement the test boring data at 20 locations. All boreholes were backfilled with soil cuttings after drilling was completed.

The following alignments were investigated for this project:

Line	Station (+/-)		
-L-	60+56	to	367+59
-Y1-	10+08	to	45+50

-Y1RPA-	10+00	to	30+50
-Y1LPA-	10+00	to	23+09
-Y1RPD-	10+00	to	29+31
-Y1LPD-	10+00	to	20+95
-Y8-	15+88	to	84+23
-Y8RPA-	10+00	to	31+61
-Y8RPB-	10+00	to	30+98
-Y8LPC-	10+00	to	23+94
-Y8LPD-	10+00	to	23+62
-Y9-	10+00	to	14+27
-DR4-	10+00	to	22+00
-SERV1-	10+00	to	71+55

Areas of Special Geotechnical Interest

The following existing subsurface conditions have been identified as areas of special interest for the project. These conditions and their impacts to the project are further discussed in the S&ME Roadway Subsurface Recommendations Report dated June 2017 and Recommendations Letter Report dated June 2017.

Plastic Clays: Some soil samples selected for laboratory testing had Plasticity Indexes of greater than 15. Soils exhibiting plastic indices greater than 15 were encountered along the proposed alignment at the following locations:

Line	Station (+/-)		
-L-	67+00	to	76+45
-L-	142+45	to	147+00
-L-	154+00	to	163+50
-L-	174+90	to	184+55
-L-	187+50	to	214+44
-L-	229+25	to	232+75
-L-	238+45	to	250+25
-L-	270+60	to	284+00
-L-	295+50	to	304+50
-L-	362+00	to	367+00
-Y1-	36+00	to	38+75
-Y1RPA-	15+00	to	31+03
-Y1LPA-	12+50	to	21+00
-Y1LPD-	11+00	to	20+95
-Y8-	19+00	to	31+40

-Y8-	58+00	to	60+25
-Y8RPA-	16+50	to	26+50
-Y8RPB-	10+00	to	13+50
-Y8RPB-	21+00	to	30+98
-Y8LPC-	10+00	to	12+75
-Y8LPD-	10+00	to	13+00
-Y8LPD-	16+60	to	18+80
-Y9-	10+00	to	14+27
-DR4-	10+00	to	17+75
-SERV1-	10+00	to	35+00
-SERV1-	59+95	to	71+55

A discussion of these plastic soils is located below in the section titled “Soil Properties”.

Loose/Soft Soils: Soft or loose soils (N-values less than 4) were encountered on the project and may impact subgrade or embankment construction. These soils were found at the following locations:

<u>Line</u>	<u>Station (+/-)</u>		
-L-	64+25	to	68+75
-L-	70+75	to	105+80
-L-	109+50	to	148+50
-L-	154+50	to	158+00
-L-	160+50	to	163+60
-L-	166+80	to	175+60
-L-	178+00	to	184+00
-L-	193+50	to	200+55
-L-	201+25	to	202+00
-L-	213+50	to	217+50
-L-	218+50	to	241+00
-L-	247+50	to	253+00
-L-	256+60	to	260+00
-L-	263+00	to	265+50
-L-	270+60	to	272+40
-L-	275+00	to	281+50
-L-	285+45	to	329+00
-L-	331+85	to	337+00
-L-	340+50	to	341+75
-L-	358+50	to	367+59
-Y1-	15+50	to	45+50

-Y1RPA-	18+00	to	22+97
-Y1LPA-	14+50	to	23+09
-Y1RPD-	10+00	to	29+31
-Y1LPD-	10+00	to	20+95
-Y8-	19+50	to	27+50
-Y8-	31+40	to	45+00
-Y8-	58+00	to	60+60
-Y8RPA-	16+00	to	23+50
-Y8RPB-	15+50	to	21+00
-Y8RPB-	23+50	to	26+50
-Y8LPC-	13+25	to	15+50
-Y8LPC-	18+50	to	23+94
-Y8LPD-	13+25	to	18+75
-Y8LPD-	21+45	to	23+62
-DR4-	10+00	to	22+00
-SERV1-	10+00	to	71+55

A discussion of these loose/soft soils is located below in the section titled “Soil Properties”.

Groundwater: High water tables, seasonal high groundwater, as well as potential perched groundwater above or within 6 feet of proposed subgrade were encountered at the following locations:

<u>Line</u>	<u>Station (+/-)</u>		
-L-	68+50	to	70+50
-L-	104+00	to	107+00
-L-	151+00	to	155+00
-L-	261+00	to	265+50
-Y1-	10+00	to	45+50
-Y1RPA-	10+00	to	30+50
-Y1RPD-	16+86	to	29+31
-Y1LPD-	16+50	to	20+95
-DR4-	10+00	to	18+00
-SERV1-	10+00	to	42+00
-SERV1-	53+00	to	71+55

### **Physiography, Geology and Surface Water**

The project site is located in Lenoir County, northeast of Kinston, North Carolina. The topography in the area is generally flat. The project area is generally open agricultural fields with some residential development.

Geologically, the project area is located within the Coastal Plain Physiographic Province. Coastal Plain deposits generally consist of poorly consolidated sediments which include gravel, sands, silts, clays, limestones and other sedimentary rocks. The deposits of the Coastal Plain form a wedge shape block that increases in thickness from an edge along its northwestern border (Fall Line), to a thickness on the order to one-half mile along the coast.

The Coastal Plain deposits dip gently towards the sea, at a rate of a few feet per mile. In general, the older formations are found outcropping toward the inner edge of the Coastal Plain. Successively younger units are found outcropping closer to the sea. The older (deeper) Coastal Plain sediments date back to the Cretaceous period and are overlain by successively younger sediments of the Tertiary and Quaternary periods.

The Coastal Plain province can be physiographically divided into the Upper Coastal Plain subprovince and the Lower Coastal Plain subprovince. The Upper Coastal Plain is located between the Lower Coastal Plain and Piedmont formations and is topographically similar to the Piedmont. Unconsolidated wind-blown dune deposits are frequently located in the Upper Coastal Plain in close proximity to the Piedmont. The Lower Coastal Plain is located between the Upper Coastal Plain and the Atlantic Ocean. The Lower Coastal Plain consists of younger, less consolidated formations and typically has very gently sloping topography and a groundwater depth of less than 10 feet. The site in Kinston is located in the Upper Coastal Plain.

Along the eastern end of the proposed alignment, outcrops of Beaufort Formation sediments were encountered. The Beaufort Formation consists of siliceous mudstone locally altered to opaline claystone or porcellanite.

Beneath a surficial layer of undivided coastal plain material, Peedee Formation sediments were encountered. The Peedee Formation materials encountered with general gray fine to medium grained sand interbedded with dark gray and black clay. Fossilized fragments and shell hash were noted in many recovered samples of Peedee formation origin.

### **Soil Properties**

Generalized subsurface conditions for the project are described below. For more detailed soil descriptions and stratifications at a particular test location, the respective profile and cross section should be reviewed.

The soil test borings generally encountered roadway embankment material, undivided coastal plain soils, Peedee Formation soils, Beaufort Formation soils, artificial fill and alluvial soils to the boring termination depths.

**Roadway Embankment Soils:** Roadway embankment soils were encountered in some soil test borings to depths ranging from 1 to 16 feet below the existing ground surface. The roadway embankment soils generally consisted of silty clays and clays (A-7-5 and A-7-6), sandy clays (A-6),

silts (A-5), sandy silts (A-4), silty sand (A-2-4), and clayey sand (A-2-6). Consistencies/relative densities ranging from very loose to dense and very soft to very stiff were recorded in the roadway embankment soils. The roadway embankment soil samples selected for laboratory testing exhibit a liquid limits ranging from 21 to 37 and a plasticity indexes from 2 to 21.

**Artificial Fill:** Artificial fill soils are present in two limited areas along the alignment. The artificial fill was generally encountered to depths ranging from 1.0 to 10 feet below the existing ground surface. The artificial fill soils generally consisted of fine sandy clays (A-6). Consistencies ranging from soft to very stiff were recorded in the artificial fill.

**Alluvial Soils:** Alluvial soils were encountered in borings near Stonyton Creek from the existing ground surface, extending to a depth of approximately 3 feet. The alluvial soils consisted of fine sandy (A-6) and clayey sand (A-2-6) with consistencies/relative densities ranging from soft, and very loose to loose.

**Undivided Coastal Plain Soils:** Beneath the roadway embankment, artificial fill, and alluvial soils or at the ground surface, undivided coastal plain soils were encountered in most borings. The undivided coastal plain soils generally consisted of sandy clay (A-6), silty clays and clays (A-7-5 and A-7-6), sandy silts (A-4), silts (A-5) and clayey and silty sands (A-2-4 and A-2-6). Consistencies/relative densities ranging from very loose to very dense and very soft to hard were recorded in undivided coastal plain soils. The undivided coastal plain soil samples selected for laboratory testing exhibit a liquid limit ranging from 18 to 60 and a plasticity index from NP to 38.

**Beaufort Formation Materials:** Beaufort Formation soils and mudstone were encountered in the eastern portion of the proposed alignment, and was first encountered at approximately station 292+00. Beaufort formation soils were encountered at depths ranging from 8 to 50 feet below existing ground surface. In general, Peedee formation soils were encountered below Beaufort Formation materials. The soils generally consisted of sandy clay (A-6), silty clays and clays (A-7-5 and A-7-6) sandy silts (A-4), and clayey sands (A-2-6). Consistencies/relative densities ranging from medium stiff to hard and medium dense to very dense were recorded in Beaufort Formation soils. Layers of mudstone exhibiting SPT N values for greater than 100 blows per foot were encountered regularly throughout the Beaufort formation. The Beaufort Formation soil samples selected for laboratory testing exhibit a liquid limit ranging from 16 to 77 and a plasticity index from 2 to 36.

**Peedee Formation Soils:** Peedee Formation soils were encountered underlying undivided coastal plain soils and Beaufort formation soils along the project corridor. Peedee formation soils generally consisted of sandy clay (A-6), silty clays and clays (A-7-5 and A-7-6) sandy silts (A-4), clayey sands (A-2-6) and silty sands (A-2-4). Consistencies/relative densities ranged from soft to hard and very loose to very dense. Layers of cemented sand exhibiting SPT N values of greater than 100 blows per foot were encountered sporadically along the alignment corridor, being more frequently encountered at deeper depths. The Peedee Formation soil samples selected for laboratory testing exhibit a liquid limits ranging from 20 to 53 and a plasticity indexes from NP to 32.

### **Ground Water**

Ground water level measurements were attempted in the borings at the completion of drilling and after a period of 24 hours in select borings. Groundwater was typically less than 6 feet below existing grades in most borings throughout the project corridor. Areas that exhibit high groundwater

(groundwater within 6 feet of proposed subgrade) are discussed in “Areas of Special Geotechnical Interest.”

The depth of ground water beneath the ground surface will fluctuate with seasonal precipitation and may occur at higher times of the year above less permeable clayey soils or weathered rock materials.

**Closure**

S&ME, Inc. appreciates the opportunity to provide our services on this project. Please contact us if you have any questions regarding this report or if we may be of further assistance.

Sincerely,

**S&ME, Inc.**

A handwritten signature in blue ink, appearing to read 'Seán W. Tiernan', is positioned above the printed name.

Seán W. Tiernan, EI  
Project Professional

Stewart S. Laney, P.E.  
Senior Project Engineer

-L-	
PI Sta 41+20.02	Pls Sta 61+01.32
$\Delta = 29^{\circ} 44' 12''$ (RT)	$\Theta_s = 0^{\circ} 30' 20.0''$
$D = 0^{\circ} 44' 56.3''$	$L_s = 135.00'$
$L = 3,963.72'$	$LT = 90.00'$
$T = 2,027.42'$	$ST = 45.00'$
$R = 7,650.00'$	
$D_s = 70\text{mph}$	
$SE = 0.03$	
$RUNOFF = 84'$	

**BEGIN TIP PROJECT R-5703**

**-L- CS Sta. 60+56.32**

**UNDIVIDED COASTAL PLAIN**

**UNDIVIDED COASTAL PLAIN**

ROADWAY EMBANKMENT

### ROADWAY EMBANKMENT

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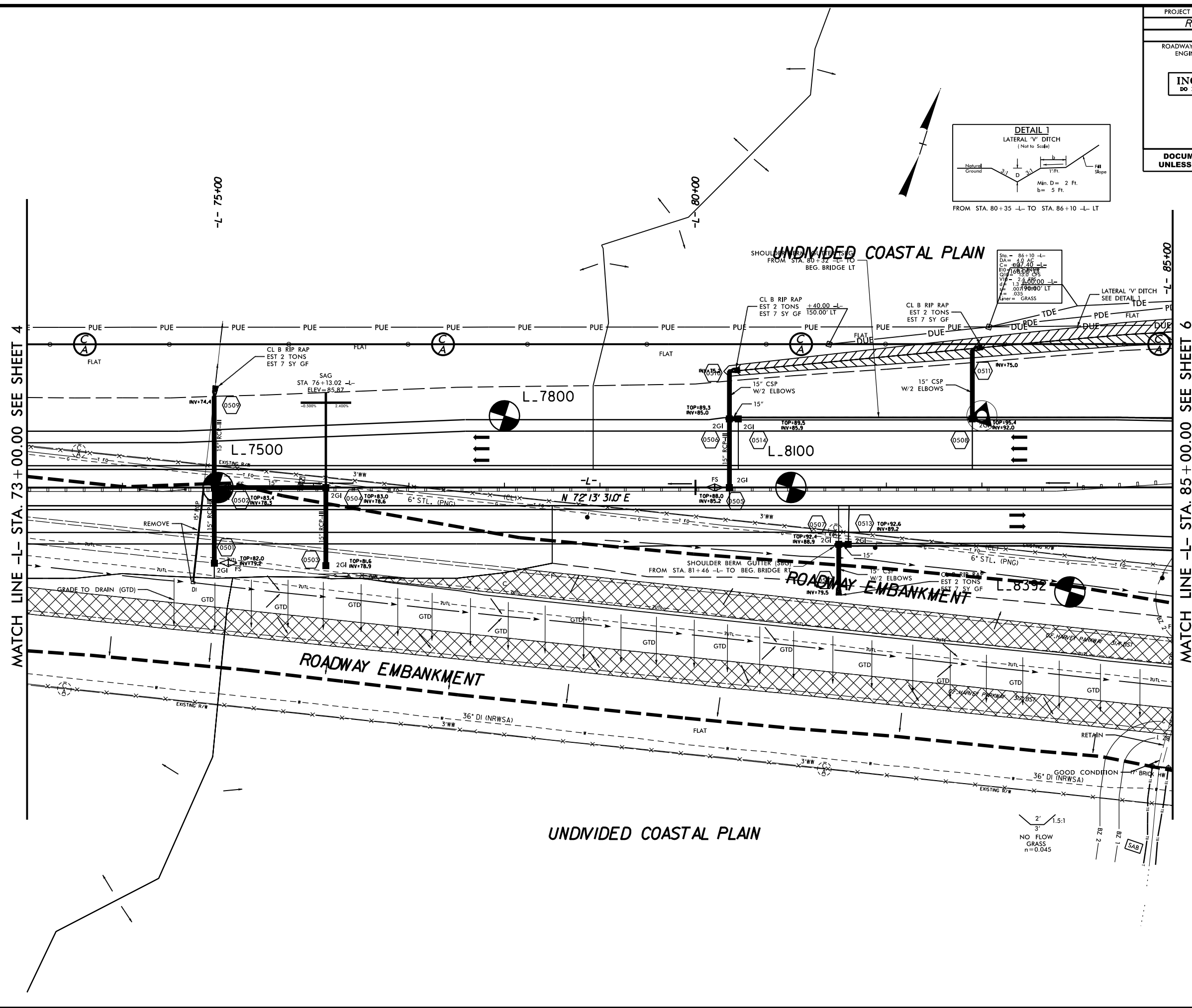
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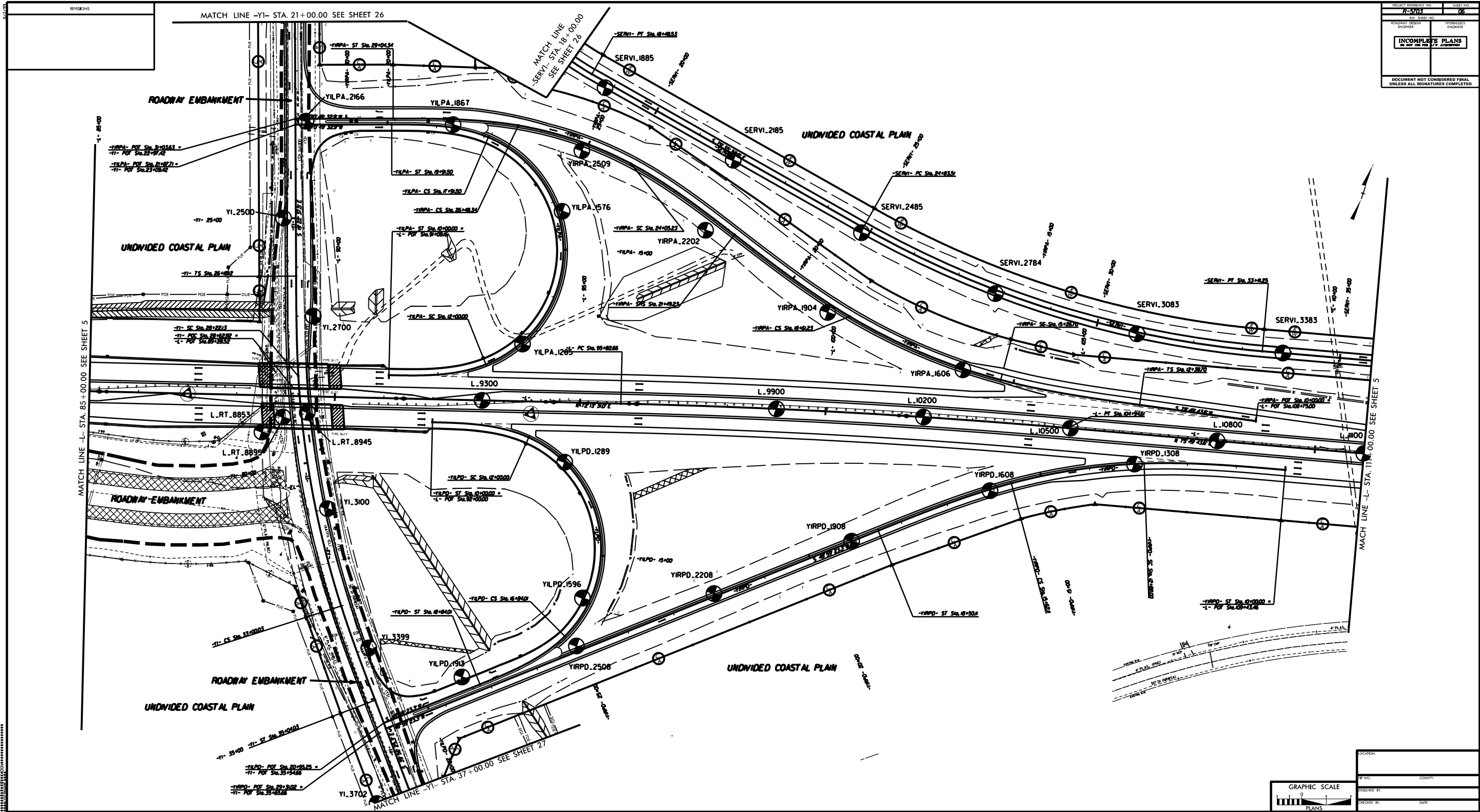
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UNLESS ALL SIGNATURES COMPLETED**







REVISIONS	

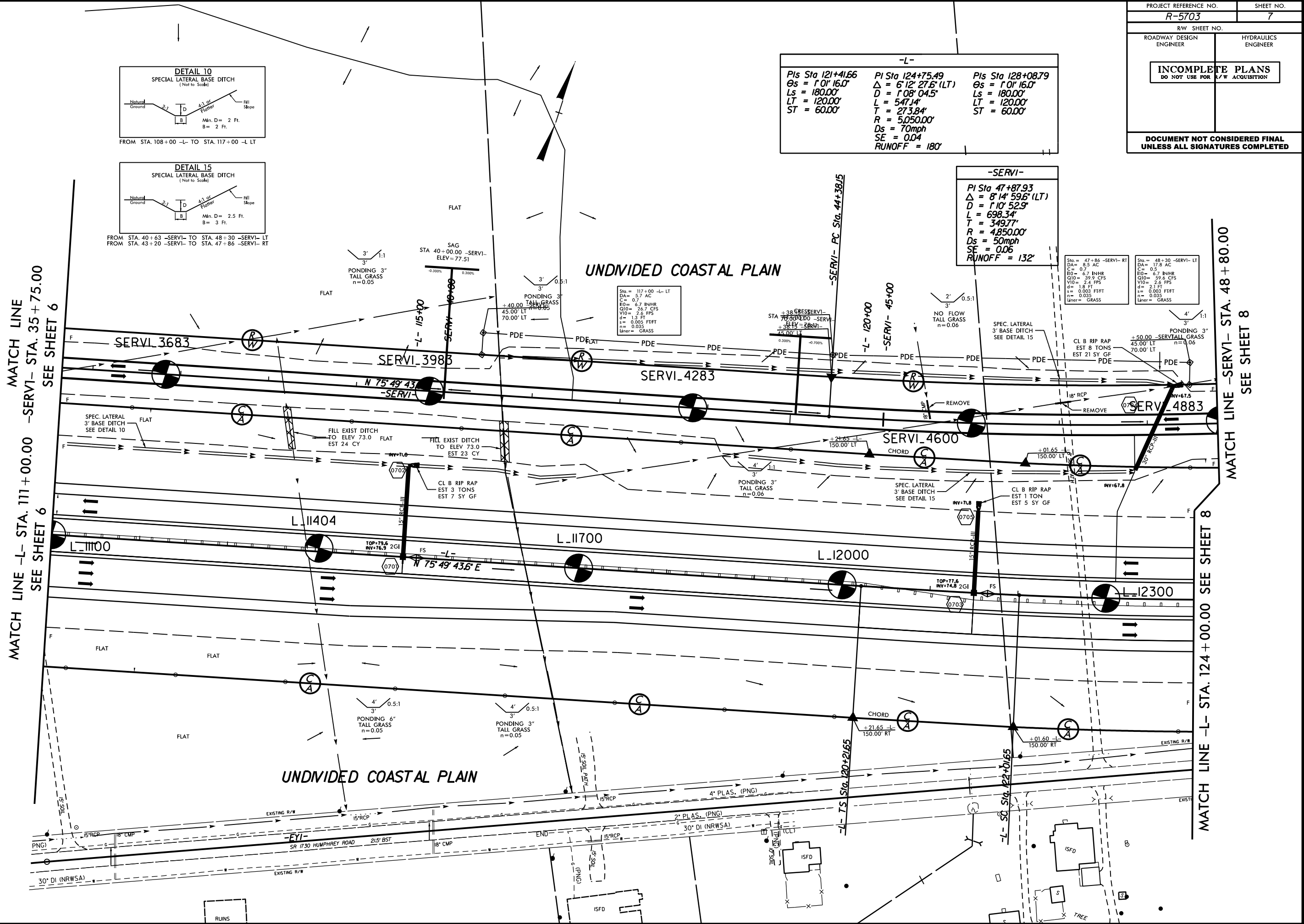
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DESIGNER: INCOMPLETE PLANS	INCHES
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

LOCATION:	
TP NO.:	COUNTY:
DESIGNED BY:	
CHECKED BY:	DATE:

PROJECT REFERENCE NO. <b>R-5703</b>		SHEET NO. <b>7</b>
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION		
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED		

MATCH LINE -L- STA. 111+00.00 -SERVI- STA. 35+75.00  
SEE SHEET 6

MATCH LINE -SERVI- STA. 48+80.00  
SEE SHEET 8



**-L-**

Pls Sta 121+41.66 θs = 1° 0' 16.0" Ls = 180.00' LT = 120.00' ST = 60.00'	Pls Sta 124+75.49 Δ = 6° 12' 27.6" (LT) D = 1° 08' 04.5" L = 547.14' T = 273.84' R = 5,050.00' Ds = 70mph SE = 0.04 RUNOFF = 180'	Pls Sta 128+08.79 θs = 1° 0' 16.0" Ls = 180.00' LT = 120.00' ST = 60.00'
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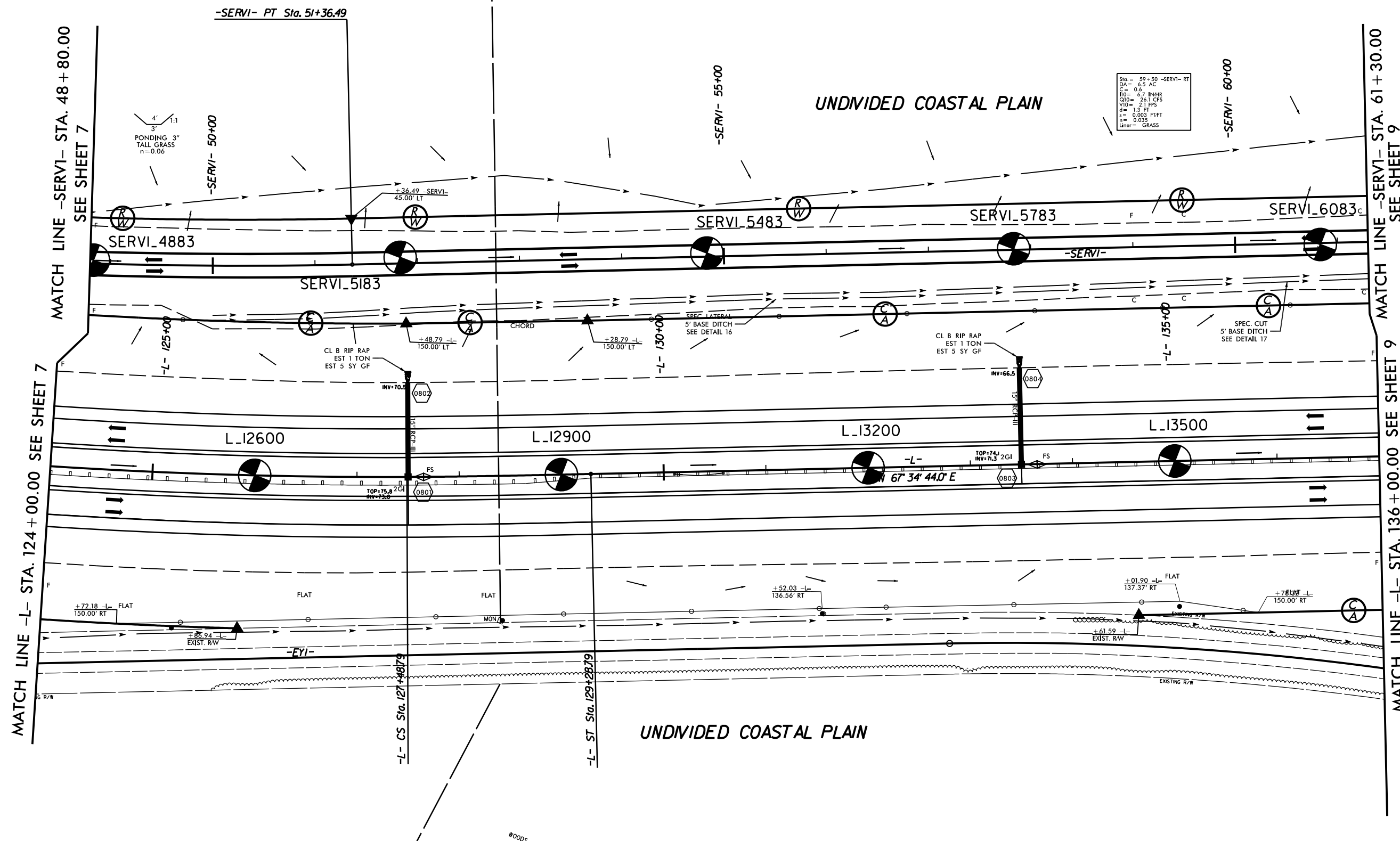
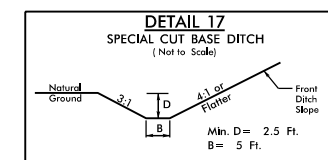
**-SERVI-**

Pls Sta 47+87.93 Δ = 8° 14' 59.6" (LT) D = 1° 10' 52.9" L = 698.34' T = 349.77' R = 4,850.00' Ds = 50mph SE = 0.06 RUNOFF = 132'
--

Sta. = 47+86 -SERVI- RT DA = 8.5 AC C = 0.7 IIO = 6.7 INHR QIO = 39.9 CFS VIO = 2.4 FPS d = 1.8 FT s = 0.003 FT/FT n = 0.035 Liner = GRASS	Sta. = 48+30 -SERVI- LT DA = 17.8 AC C = 0.5 IIO = 6.7 INHR QIO = 59.8 CFS VIO = 2.6 FPS d = 2.1 FT s = 0.003 FT/FT n = 0.035 Liner = GRASS
---	--

**-SERVI-**

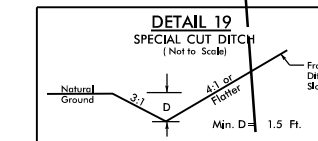
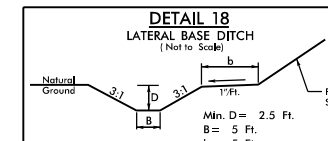
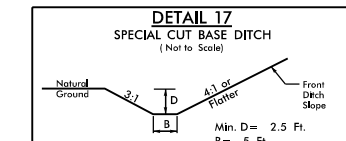
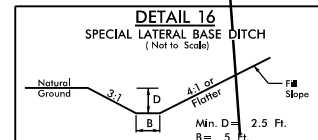
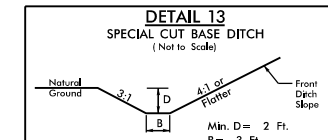
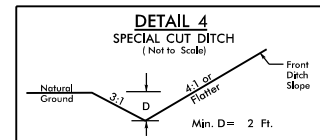
PI Sta 47+87.93  
 $\Delta = 8^{\circ}14'59.6"$  (LT)  
 $D = 1^{\circ}10'52.9"$   
 $L = 698.34'$   
 $T = 349.77'$   
 $R = 4850.00'$   
 $Ds = 50\text{mph}$   
 $SE = 0.06$   
 $RUNOFF = 132'$



PROJECT REFERENCE NO.	SHEET NO.
R-5703	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-L-		
Pls Sta 146+74.40	Pl Sta 158+61.41	Pls Sta 169+65.70
Os = 2' 27" 19.9"	Δ = 38' 24" 10.2" (RT)	Os = 2' 27" 19.9"
Ls = 270.00'	D = 1' 49" 08.1"	Ls = 270.00'
LT = 180.02'	L = 2' 11.31"	LT = 180.02'
ST = 90.02'	T = 1' 09" 03.3"	ST = 90.02'
	R = 3' 50.00'	
	Ds = 70mph	
	SE = 0.06	
	RUNOFF = 270'	

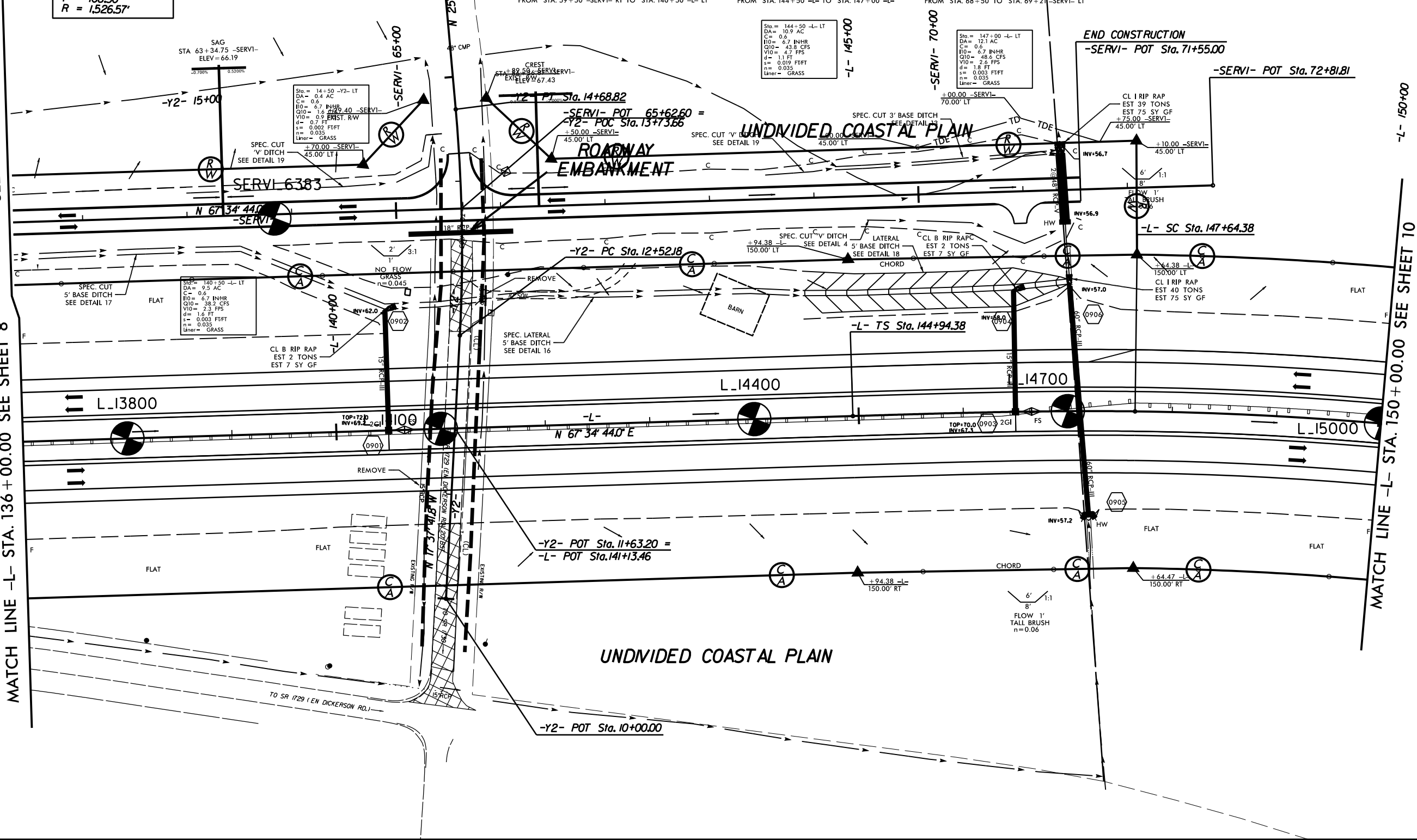
-Y2-
Pl Sta 13+60.68
Δ = 8' 07" 51.8" (LT)
D = 3' 45" 11.7"
L = 216.64'
T = 108.50'
R = 1,526.57'



MATCH LINE -SERVI- STA. 61+30.00  
SEE SHEET 8

MATCH LINE -L- STA. 136+00.00 SEE SHEET 8

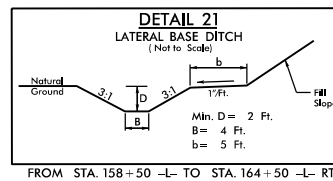
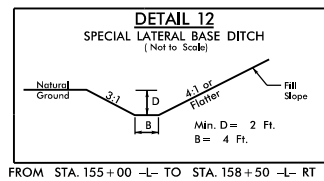
MATCH LINE -L- STA. 150+00.00 SEE SHEET 10



-L-		
<i>Pis Sta 146+74.40</i>	<i>Pi Sta 158+61.41</i>	<i>Pis Sta 169+65.70</i>
<i>Θs = 2° 27' 19.9"</i>	<i>Δ = 38° 24' 10.2" (RT)</i>	<i>Θs = 2° 27' 19.9"</i>
<i>Ls = 270.00'</i>	<i>D = 1° 49' 08.8"</i>	<i>Ls = 270.00'</i>
<i>LT = 180.02'</i>	<i>L = 2111.31'</i>	<i>LT = 180.02'</i>
<i>ST = 90.02'</i>	<i>T = 1097.03'</i>	<i>ST = 90.02'</i>
	<i>R = 3150.00'</i>	
	<i>DS = 70mph</i>	
	<i>SE = 0.06</i>	
	<i>RUNOFF = 270'</i>	

**UNDIVIDED COASTAL PLAIN**

**UNDIVIDED COASTAL PLAIN**



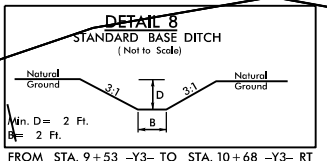
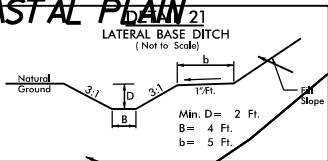
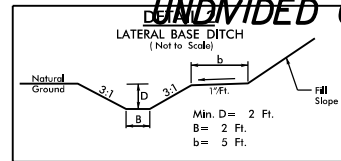
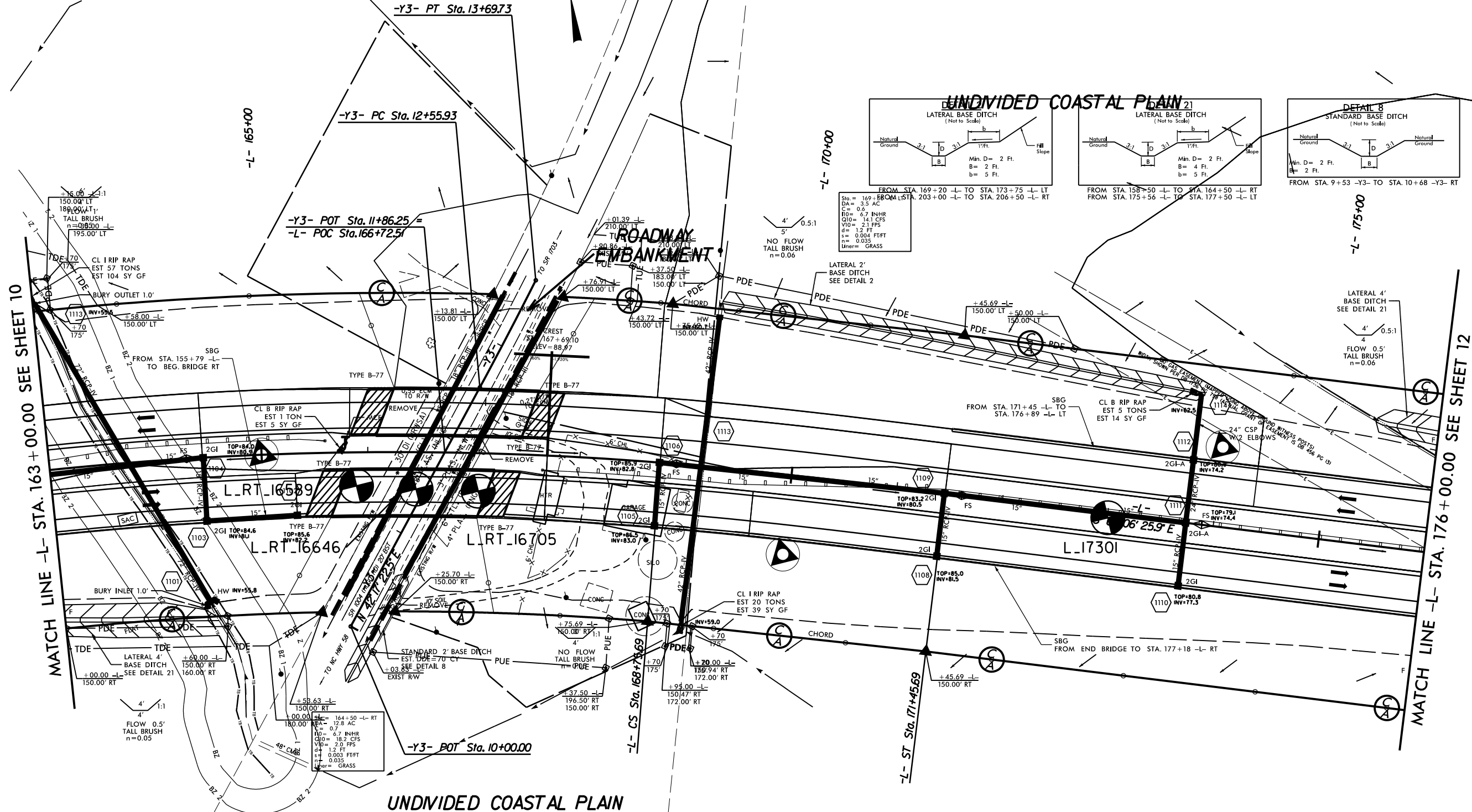
```
Sta. = 158+50 -L- RT
DA = 6.6 AC
C = 0.7
II0 = 6.7 IN/HR
Q10 = 31.0 CFS
V10 = 2.2 FPS
d = 1.5 FT
s = 0.003 FT/FT
n = 0.035
Liner = GRASS
```

Sta. = 164+50 -L- RT  
DA = 12.8 AC  
C = 0.7  
IIO = 6.7 INHR  
Q10 = 18.2 CFS  
V10 = 2.0 FPS  
d = 1.2 FT  
s = 0.003 FT/FT  
n = 0.035  
Liner = GRASS

PROJECT REFERENCE NO.	SHEET NO.
R-5703	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

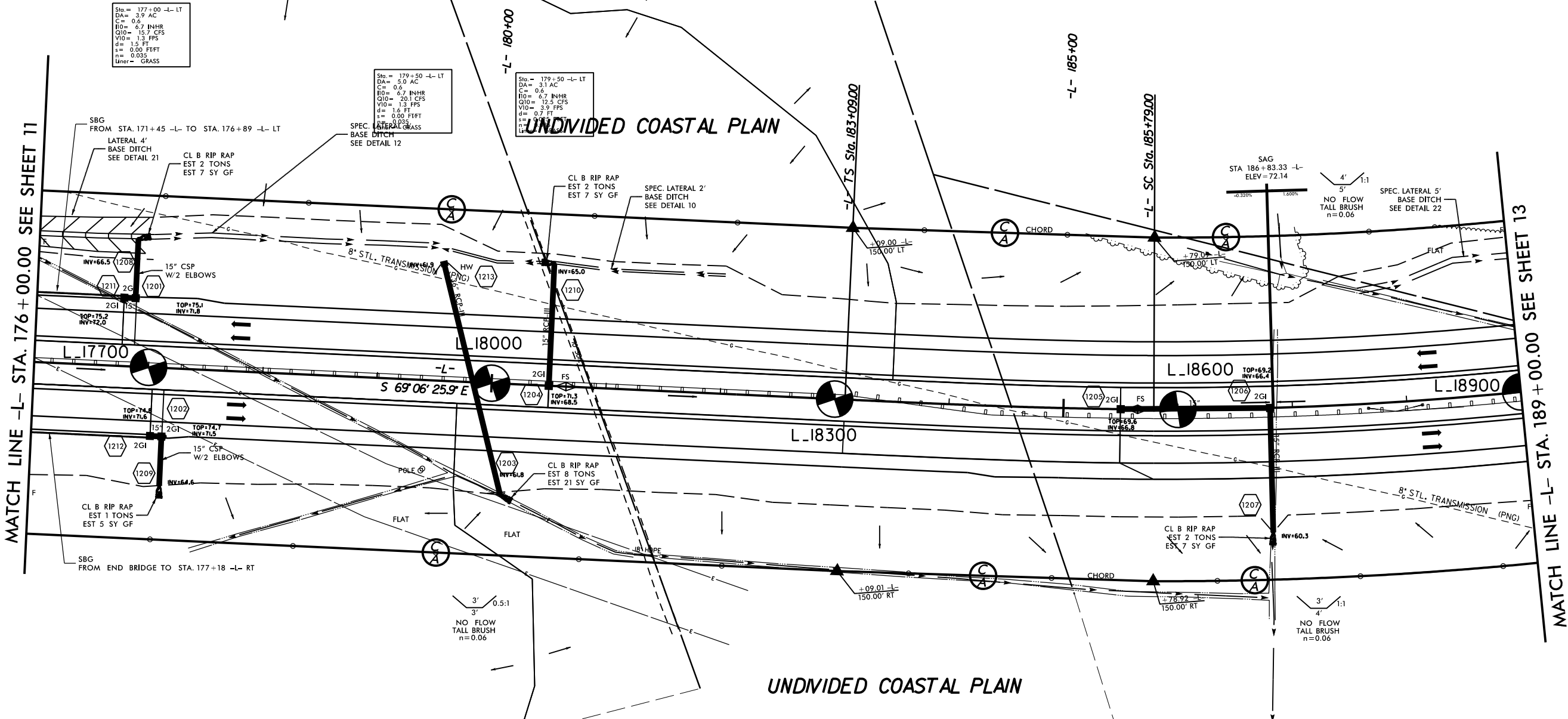
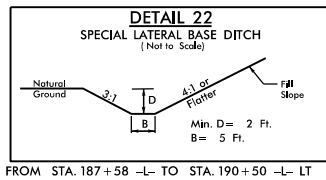
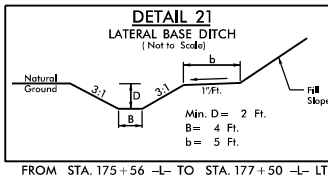
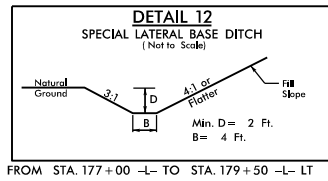
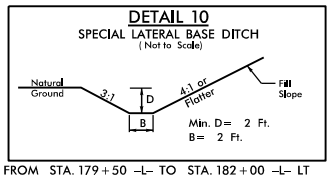
-L-		
Pls Sta 146+74.40	PI Sta 158+61.41	Pls Sta 169+65.70
$\Delta s = 2' 27" 19.9"$	$\Delta = 38' 24" 10.2" (RT)$	$\Delta s = 2' 27" 19.9"$
$Ls = 270.00'$	$D = 1' 49' 08.1"$	$Ls = 270.00'$
$LT = 180.02'$	$L = 211.31'$	$LT = 180.02'$
$ST = 90.02'$	$T = 1097.03'$	$ST = 90.02'$
	$R = 3150.00'$	
	$Ds = 70mph$	
	$SE = 0.06$	
	$RUNOFF = 270'$	

-Y3-	
PI Sta 13+12.83	$\Delta = 1' 39' 17.4" (LT)$
$D = 1' 27' 15.1"$	
$L = 113.80'$	
$T = 56.90'$	
$R = 3940.00'$	
$Ds = 55mph$	
$SE = EXIST$	

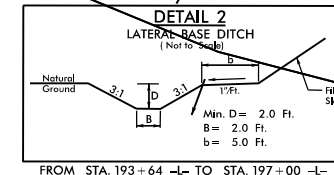
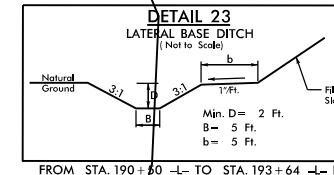
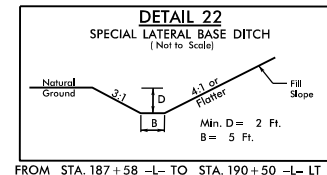
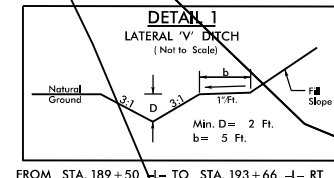
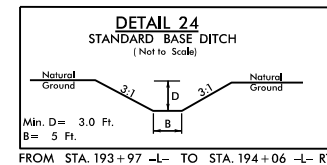


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C:\PROJECTS\5703\5703.DGN  
8/17/99 11:00 AM

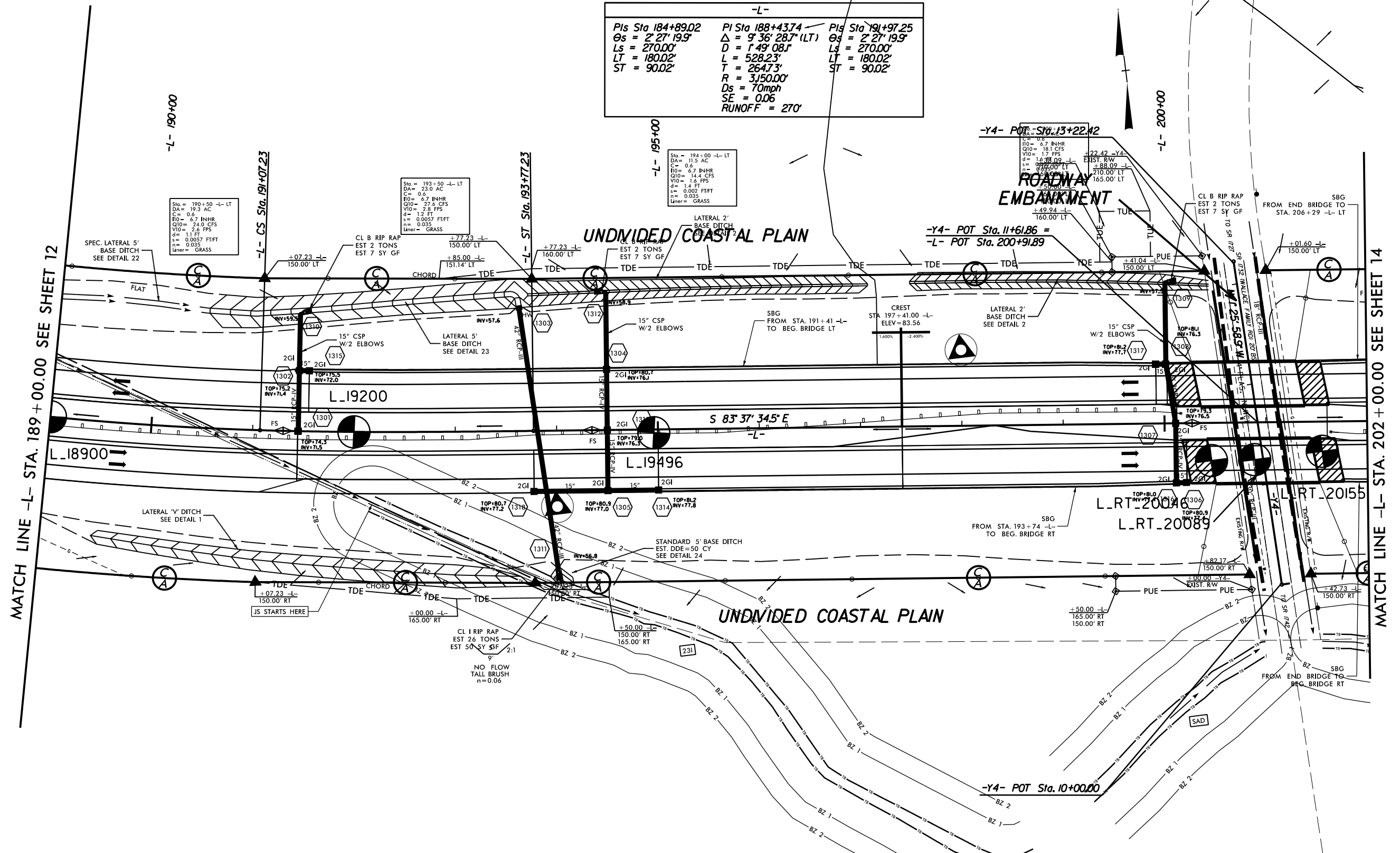
PROJECT REFERENCE NO.		SHEET NO.	
R-5703		12	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION			
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED			



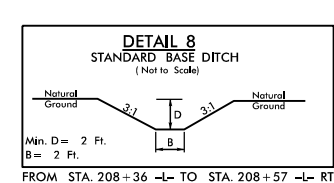
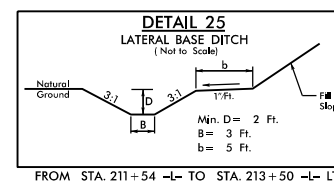
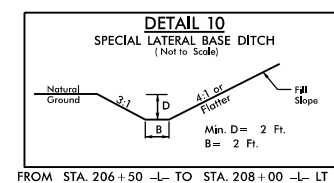
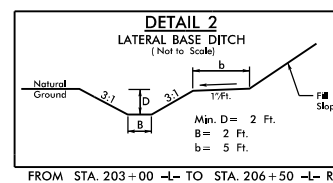
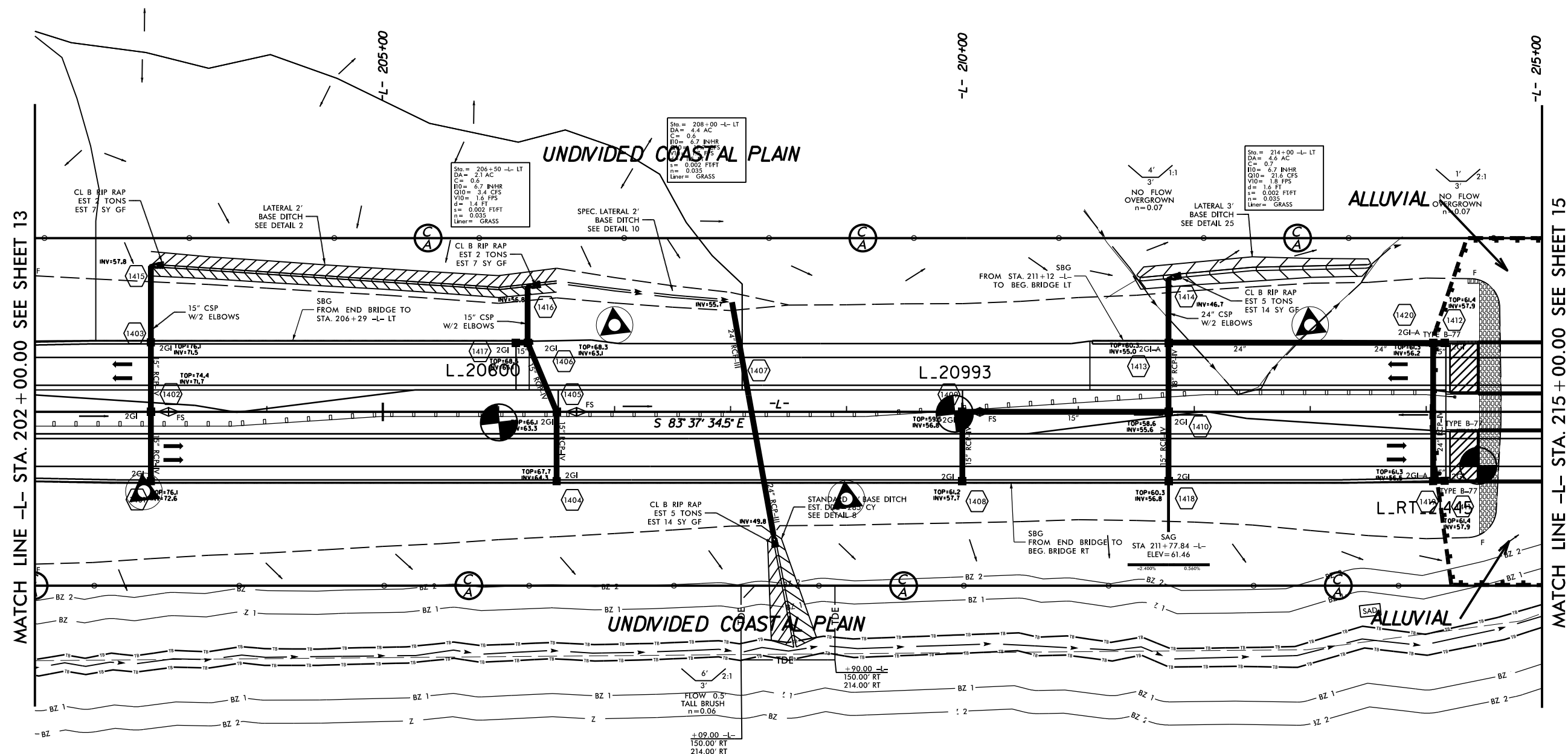
-L-		
Pls Sta 184+89.02	Pls Sta 188+43.74	Pls Sta 191+97.25
θs = 2° 27' 19.9"	Δ = 9° 36' 28.7" (LT)	θs = 2° 27' 19.9"
Ls = 270.00'	D = 1° 49' 08.1"	Ls = 270.00'
LT = 180.02'	L = 528.23'	LT = 180.02'
ST = 90.02'	T = 264.73'	ST = 90.02'
	R = 3,150.00'	
	Ds = 70mph	
	SE = 0.06	
	RUNOFF = 270'	

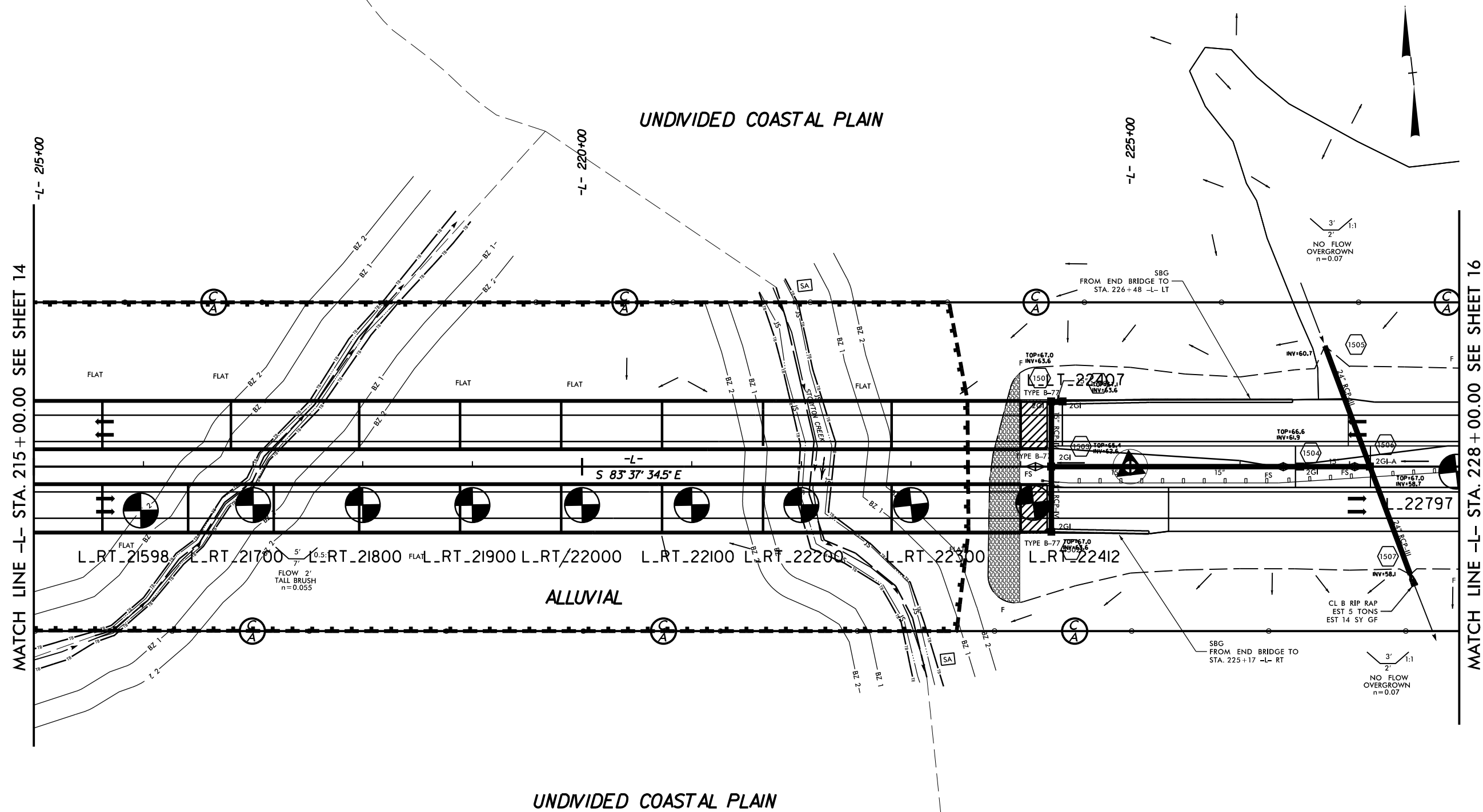


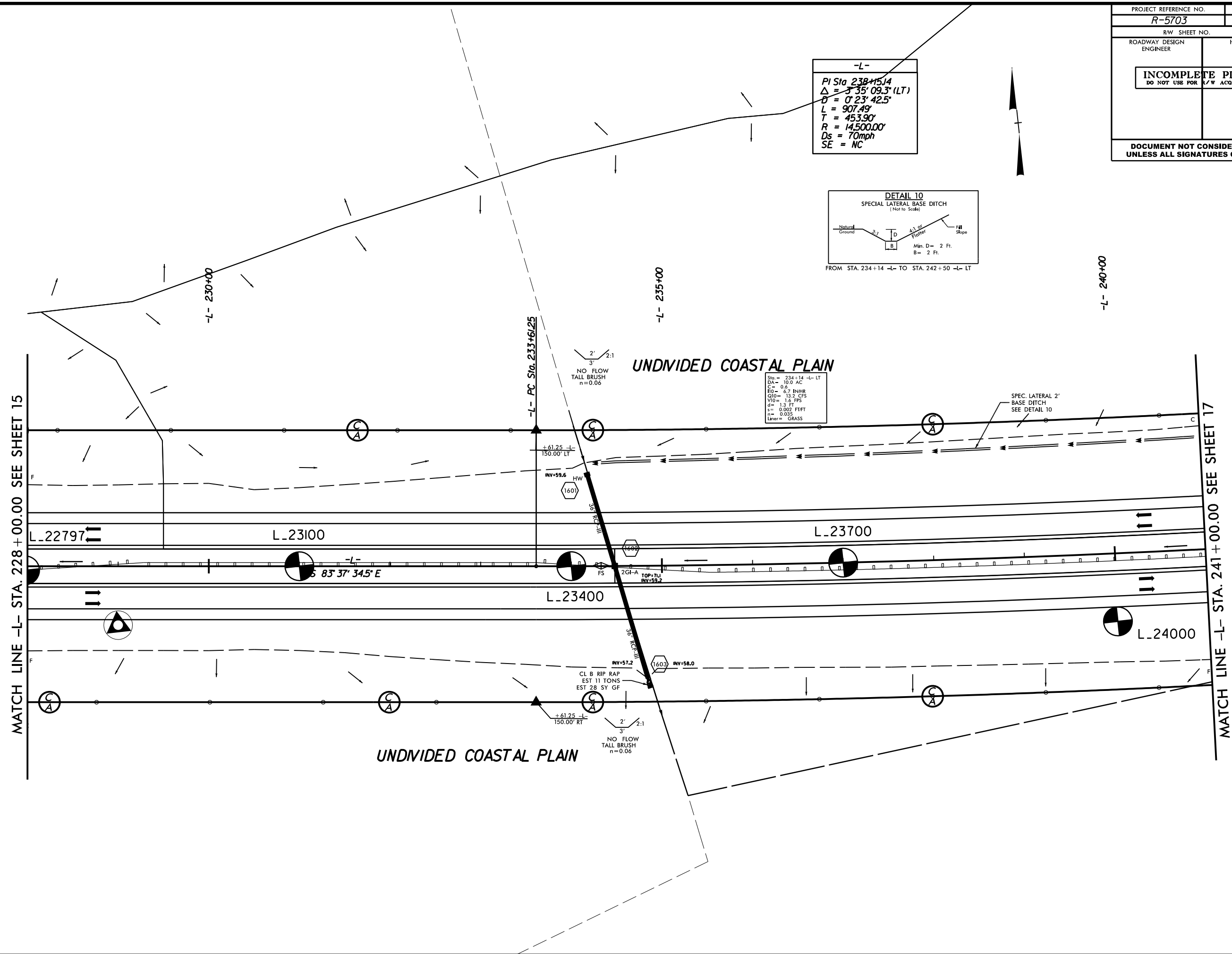
-L-		
<i>Pls Sta 184+89.02</i>	<i>Pl Sta 188+43.74</i>	<i>Pls Sta 191+97.25</i>
<i>Os = 2' 27" 19.9"</i>	<i>Δ = 9' 36" 28.7" (LT)</i>	<i>Os = 2' 27" 19.9"</i>
<i>Ls = 270.00'</i>	<i>D = 1' 49" 08.1"</i>	<i>Ls = 270.00'</i>
<i>LT = 180.02'</i>	<i>L = 528.23'</i>	<i>LT = 180.02'</i>
<i>ST = 90.02'</i>	<i>T = 264.73'</i>	<i>ST = 90.02'</i>
	<i>R = 3,150.00'</i>	
	<i>Ds = 70mph</i>	
	<i>SE = 0.06</i>	
	<i>RUNOFF = 270'</i>	

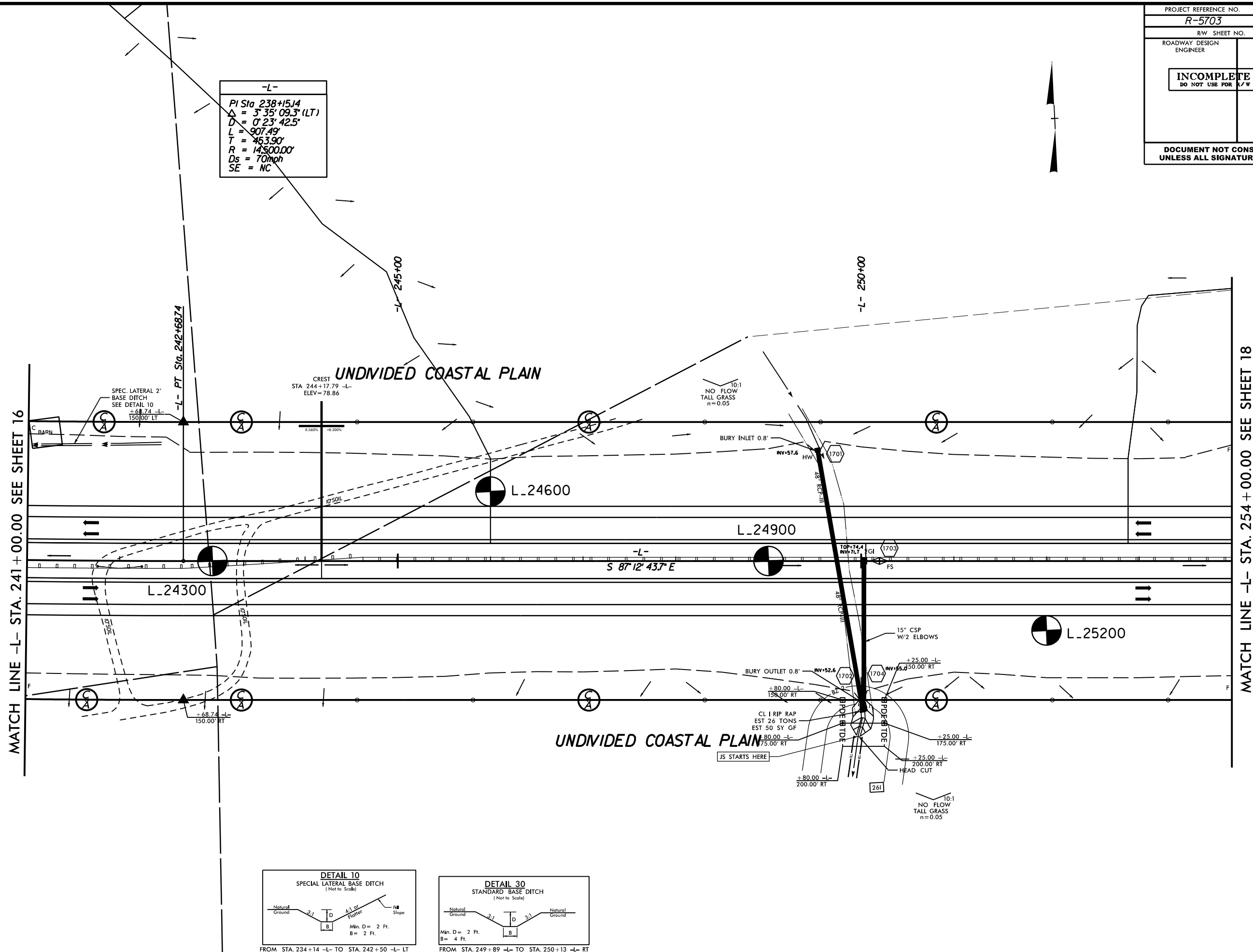












SYSTEMS GUIDANCE

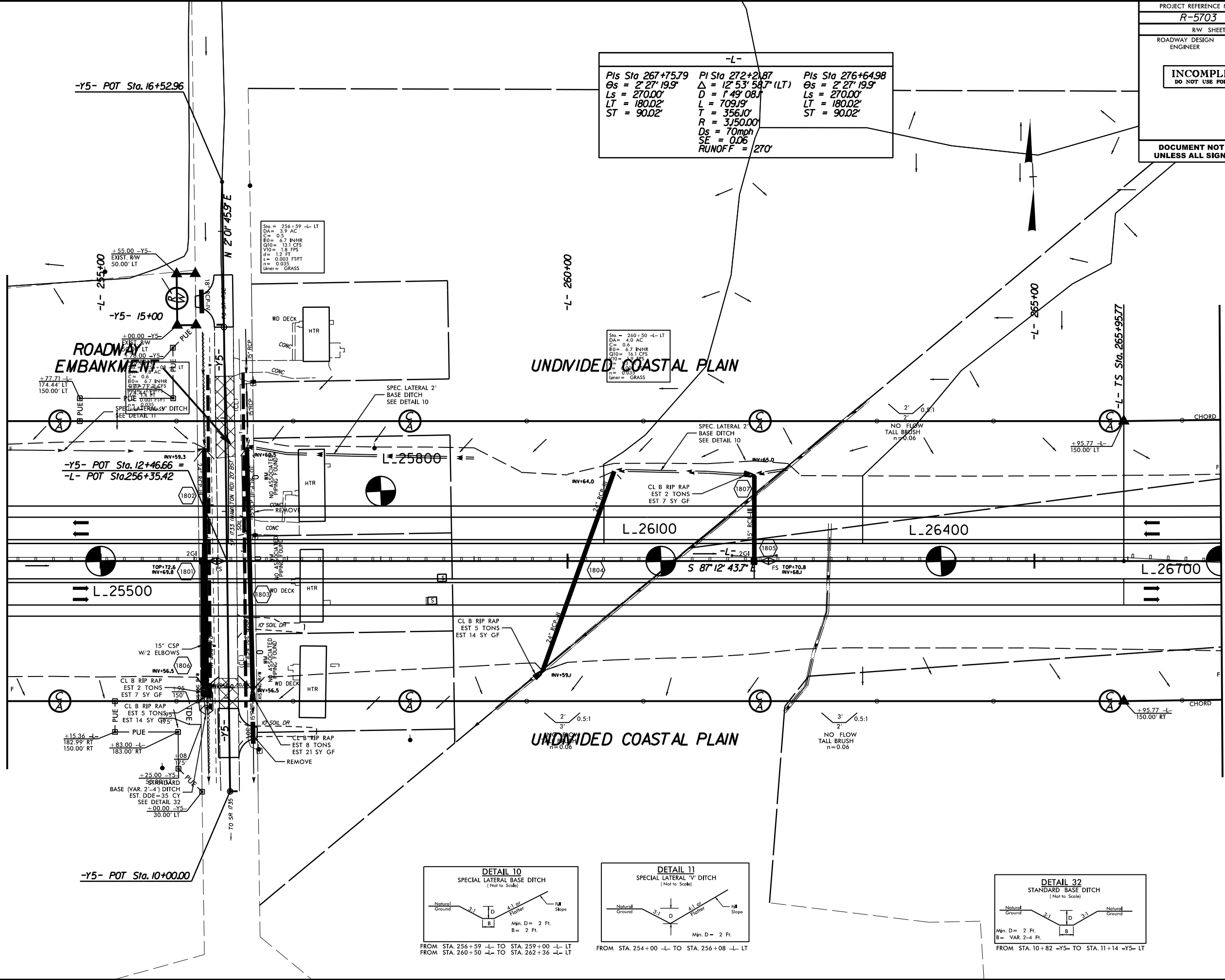
8/17/99

SYTIME\$\$\$\$\$  
C:\PROJECTS\9908\9908.DGN

PROJECT REFERENCE NO.	SHEET NO.
R-5703	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

MATCH LINE -L- STA. 254 + 00.00 SEE SHEET 17

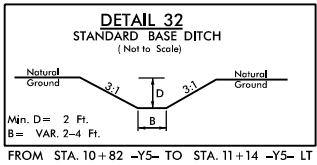
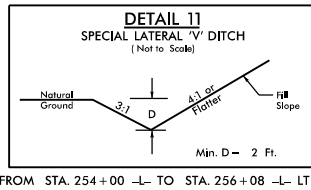
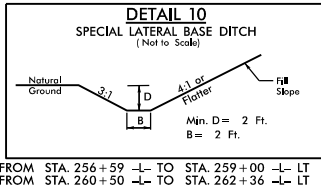
MATCH LINE -L- STA. 267 + 00.00 SEE SHEET 19



Pls Sta 267+75.79 θs = 2° 27' 19.9" Ls = 270.00' LT = 180.02' ST = 90.02'	Pls Sta 272+21.87 Δ = 12° 53' 58.7" (LT) D = 1° 49' 08.1" L = 709.19' T = 356.10' Ds = 70mph SE = 0.06 RUNOFF = 270'	Pls Sta 276+64.98 θs = 2° 27' 19.9" Ls = 270.00' LT = 180.02' ST = 90.02'
---	---	---

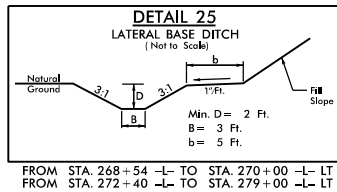
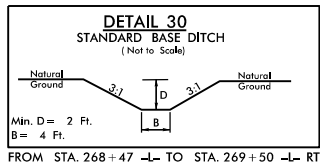
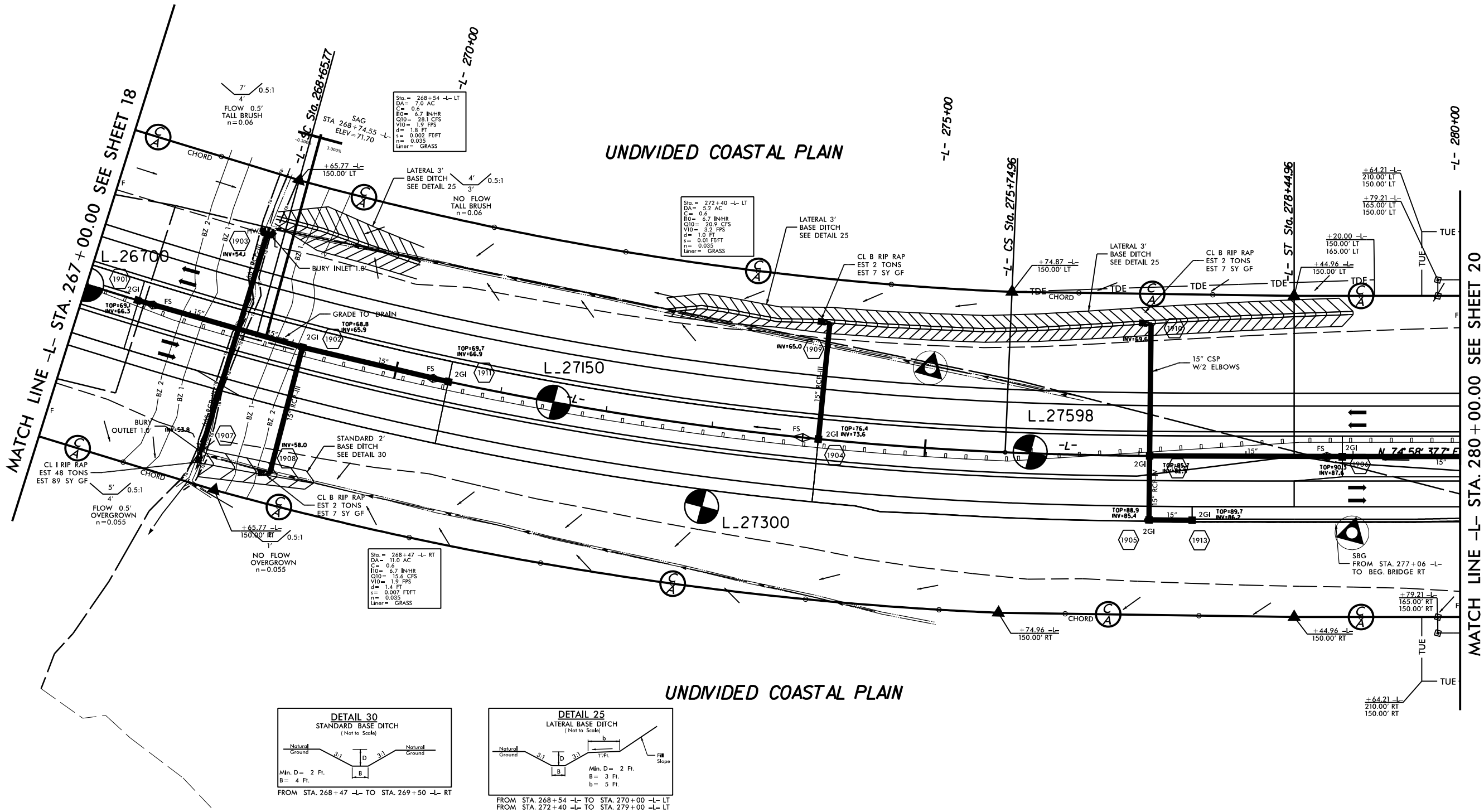
Sta = 256+59 -L- LT
DA = 3.9 AC
C = 0.6
Q10 = 6.7 INHR
Q10 = 13.1 CFS
V10 = 1.8 FPS
n = 0.035
Liner = GRASS

Sta = 250+50 -L- LT
DA = 4.0 AC
C = 0.6
Q10 = 6.7 INHR
Q10 = 16.1 CFS
V10 = 2.0 FPS
n = 0.035
Liner = GRASS

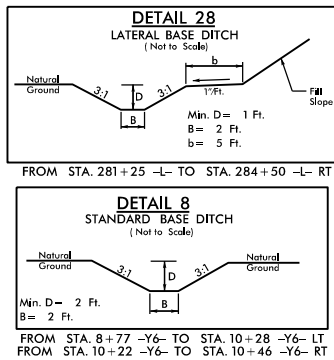


PROJECT REFERENCE NO.	SHEET NO.
R-5703	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

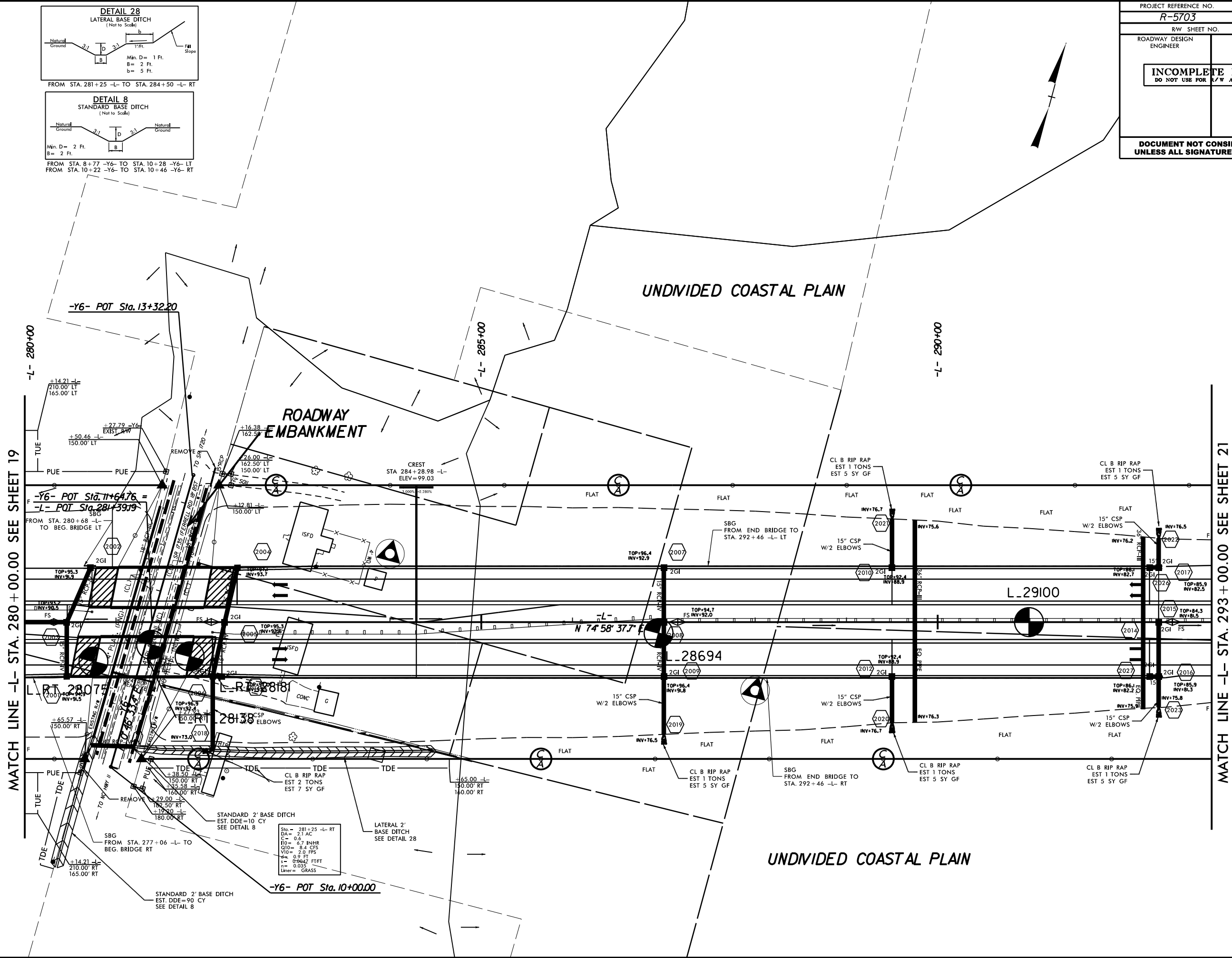
-L-		
Pls Sta 267+75.79	Pls Sta 272+21.87	Pls Sta 276+64.98
$\theta_s = 2' 27'' 19.9''$	$\Delta = 12' 53'' 58.7''$ (LT)	$\theta_s = 2' 27'' 19.9''$
$L_s = 270.00'$	$D = 1' 49'' 08.1''$	$L_s = 270.00'$
$LT = 180.02'$	$L = 709.19'$	$LT = 180.02'$
$ST = 90.02'$	$T = 356.10'$	$ST = 90.02'$
	$R = 3,150.00'$	
	$D_s = 70\text{mph}$	
	$SE = 0.06$	
	$RUNOFF = 270'$	



8/17/99  
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PROJECT REFERENCE NO.	SHEET NO.
R-5703	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



8/17/99

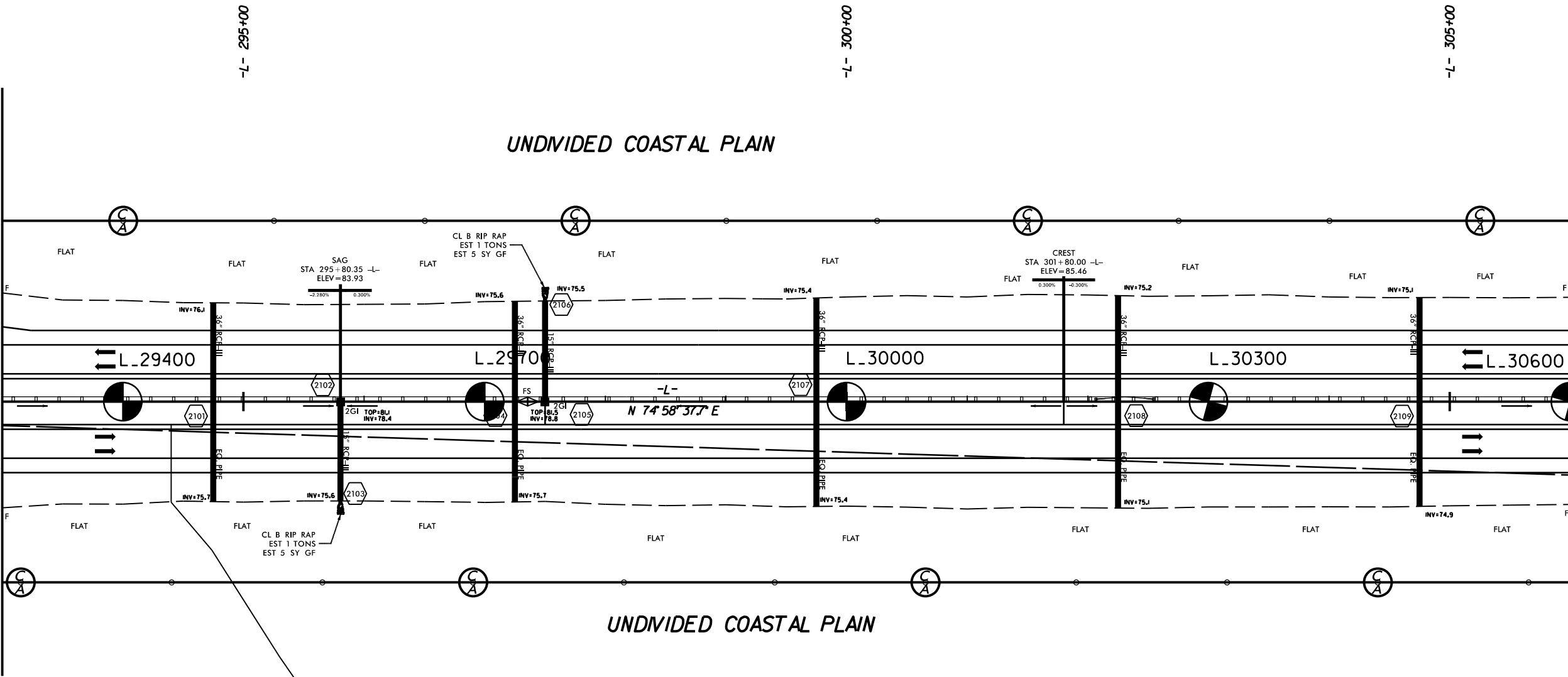
PROJECT REFERENCE NO.	SHEET NO.
R-5703	21
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

MATCH LINE -L- STA. 293+00.00 SEE SHEET 20

MATCH LINE -L- STA. 306+00.00 SEE SHEET 22

UNDIVIDED COASTAL PLAIN

UNDIVIDED COASTAL PLAIN



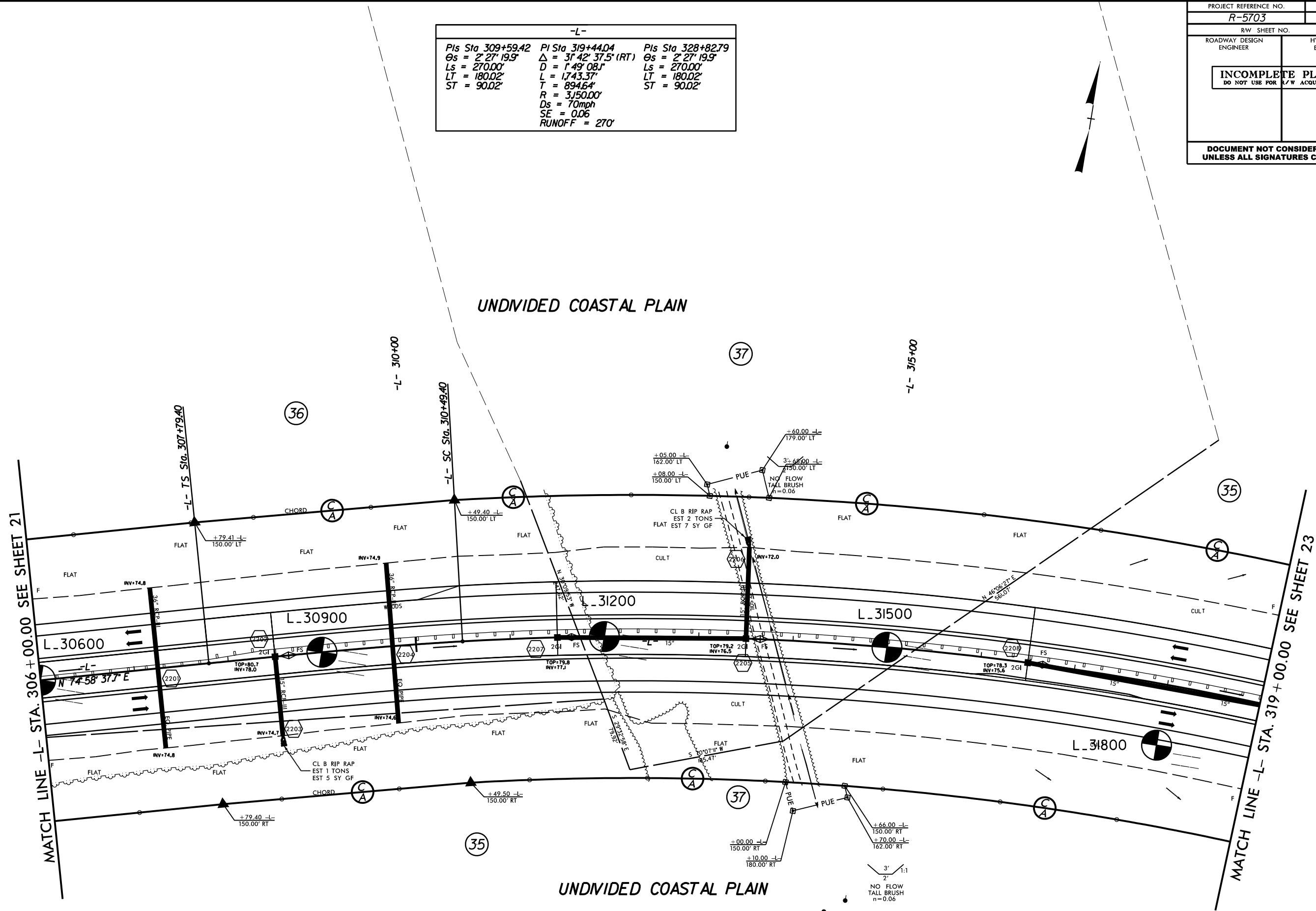


8/17/99

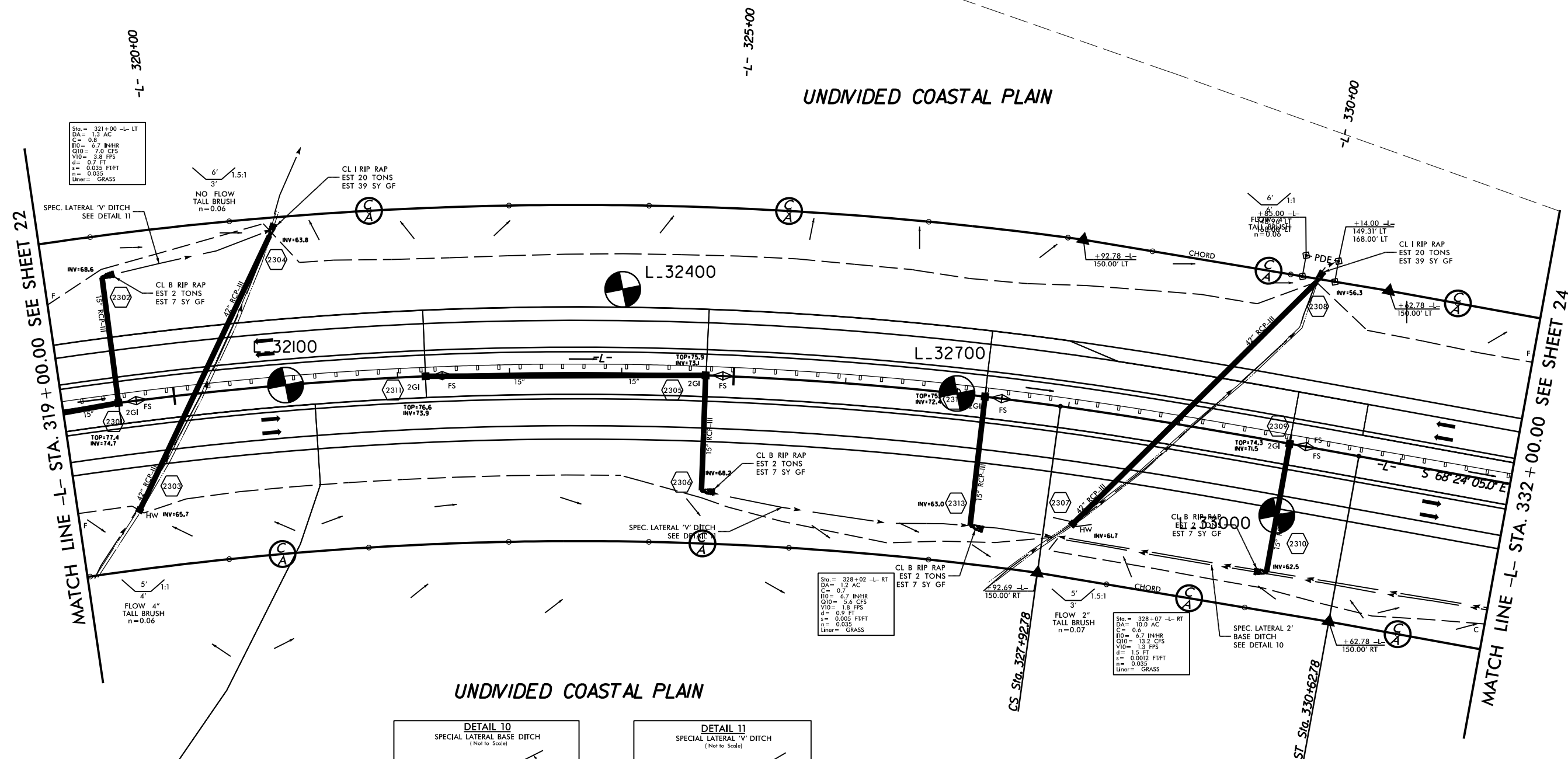
SYTIME\$\$\$\$\$  
C:\PROJECTS\990801\990801.DGN

-L-		
Pls Sta 309+59.42	Pls Sta 319+44.04	Pls Sta 328+82.79
$\theta_s = 2' 27' 19.9''$	$\Delta = 31' 42' 37.5''$ (RT)	$\theta_s = 2' 27' 19.9''$
Ls = 270.00'	D = 1' 49' 08.1'	Ls = 270.00'
LT = 180.02'	L = 1,743.37'	LT = 180.02'
ST = 90.02'	T = 894.64'	ST = 90.02'
	R = 3,150.00'	
	Ds = 70mph	
	SE = 0.06	
	RUNOFF = 270'	

PROJECT REFERENCE NO.	SHEET NO.
R-5703	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



-L-		
Pls Sta 309+59.42	Pl Sta 319+44.04	Pls Sta 328+82.79
Gs = 2' 27' 19"	$\Delta = 3' 42' 37.5" (RT)$	Gs = 2' 27' 19"
Ls = 270.00'	D = 1' 49' 08.1"	Ls = 270.00'
LT = 180.02'	L = 1743.37'	LT = 180.02'
ST = 90.02'	T = 894.64'	ST = 90.02'
	R = 3150.00'	
	Ds = 70mph	
	SE = 0.06	
	RUNOFF = 270'	



**DETAIL 10**  
**SPECIAL LATERAL BASE DITCH**  
(Not to Scale)

Natural Ground 3:1 D 4:1 or Flatter Fill Slope

Min. D = 2 Ft.  
B = 2 Ft.

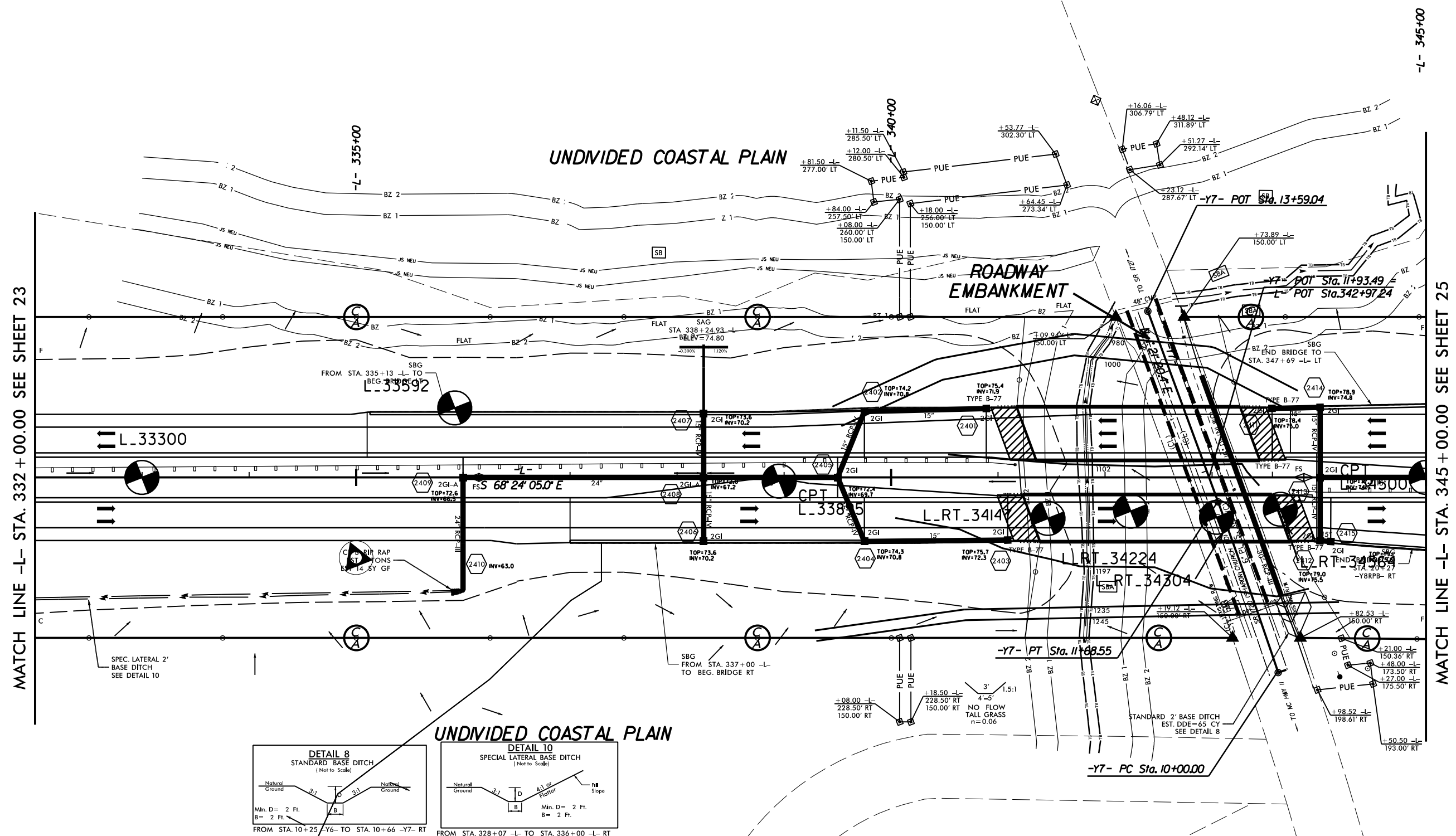
FROM STA. 328+07 TO STA. 336+00

**DETAIL 11**  
SPECIAL LATERAL 'V' DITCH  
(Not to Scale)

3:1  
D  
4:1 or Flatter  
Fill Slope  
Natural Ground  
Min. D = 2 Ft.

FROM STA. 319+50 TO STA. 324+75  
TO STA. 321+00 TO STA. 328+02

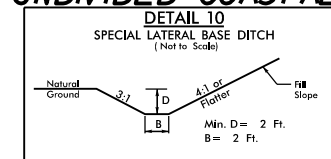
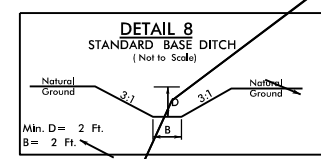
PI Sta 10+84.28  
 $\Delta = 143^{\circ} 28.3' (LT)$   
 $D = 101^{\circ} 23.3'$   
 $L = 168.55'$   
 $T = 84.28'$   
 $R = 5600.00'$   
 $Ds = 55\text{mph}$   
 $SE = \text{EXIST}$



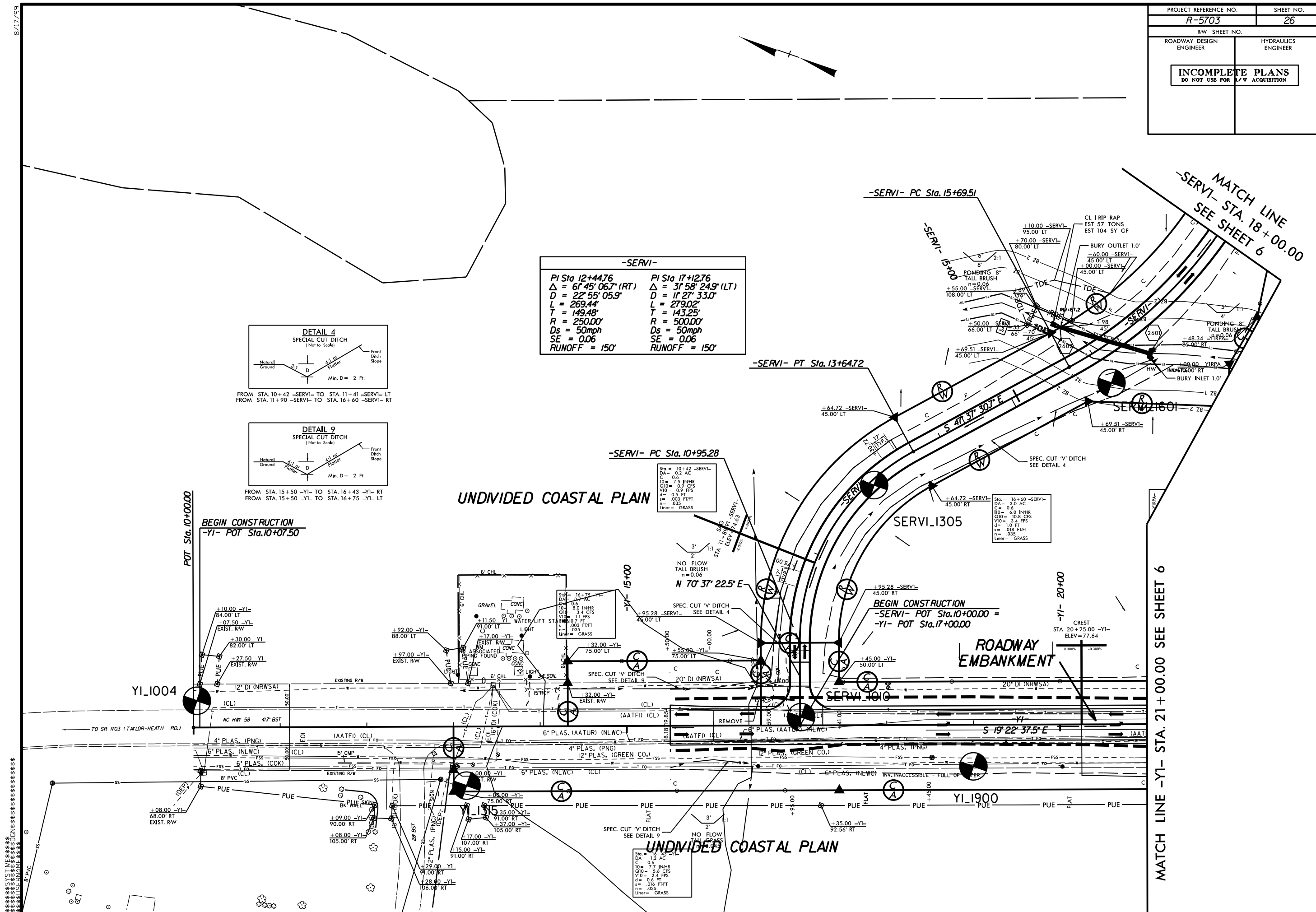
MATCH LINE -L- STA. 332 + 00.00 SEE SHEET 23

-L- 545+00

MATCH LINE -L- STA. 345+00.00 SEE SHEET 25







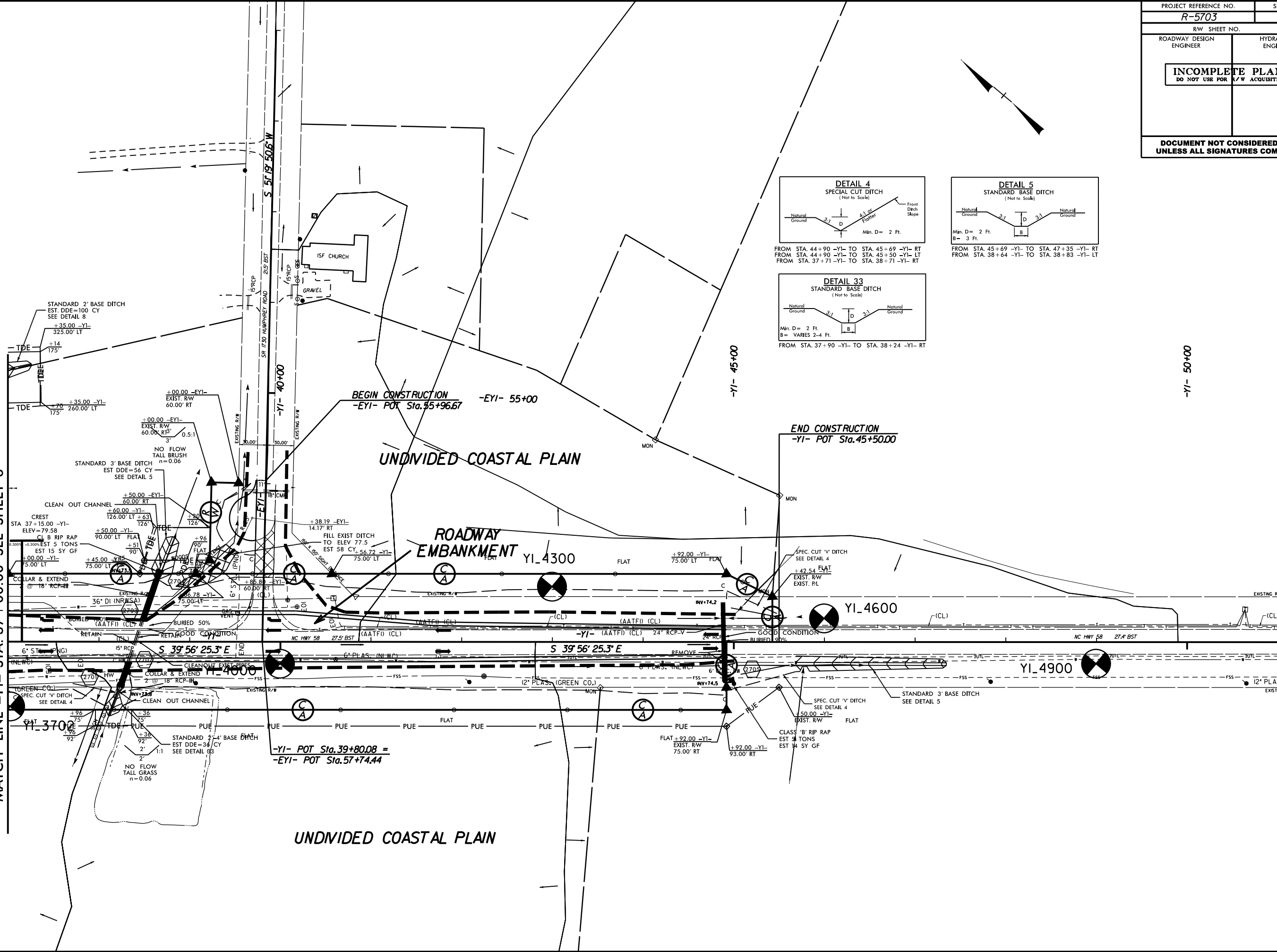
8/17/99

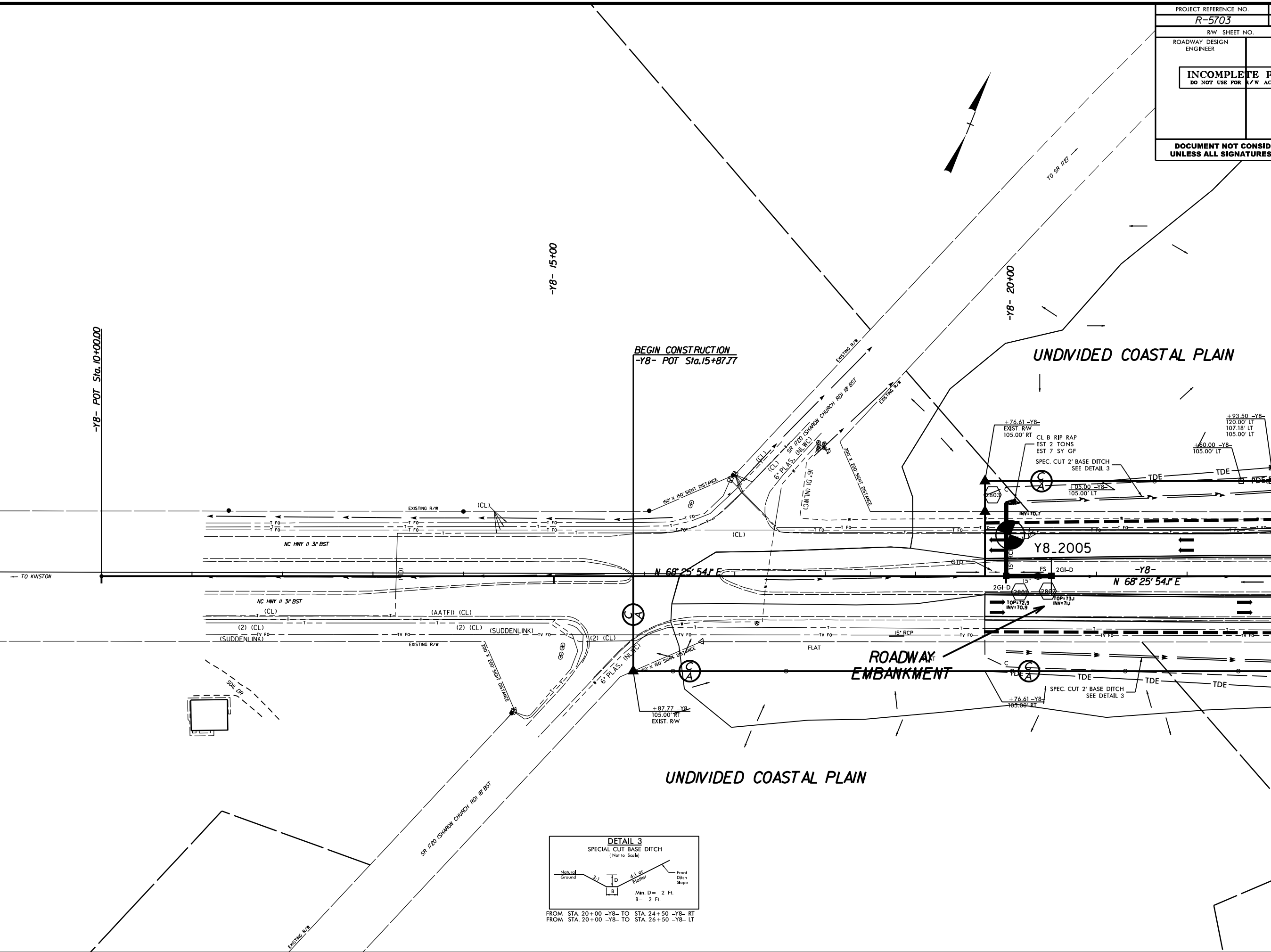
SYTIME

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-5703	27
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

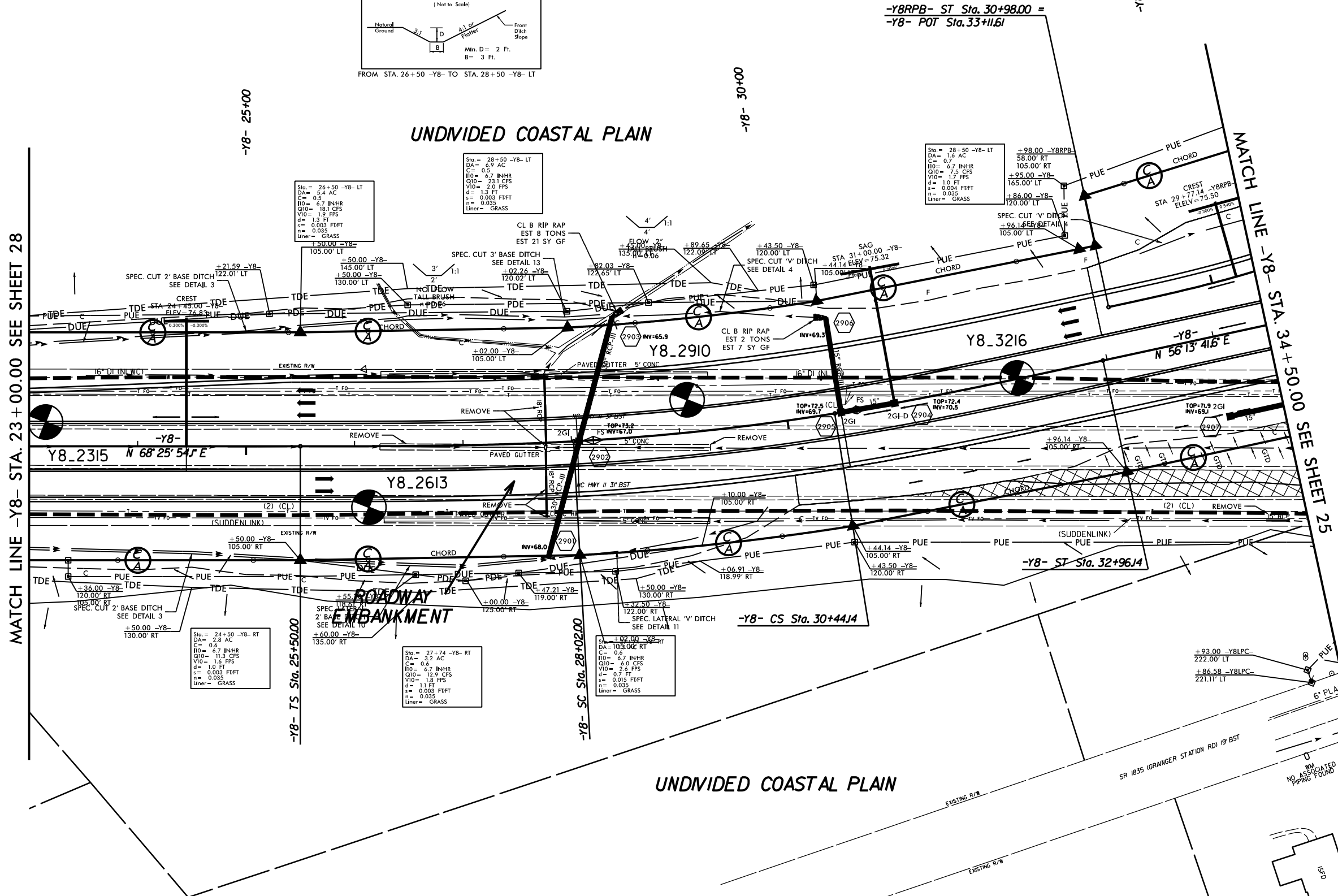
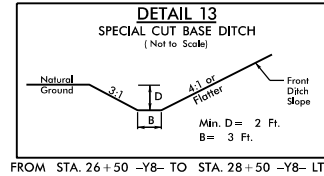
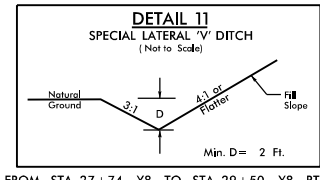
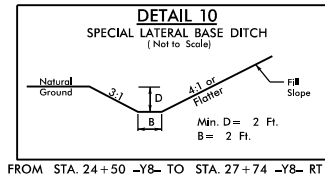
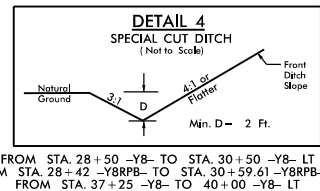
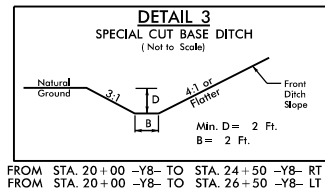
MATCH LINE -YI- STA. 37+00.00 SEE SHEET 6





MATCH LINE -Y8- STA. 23+00.00 SEE SHEET 29

-Y8-		
Pls Sta 27+18.03	Pls Sta 29+23.18	Pls Sta 31+28.16
Os = 3' 06' 42.3"	Δ = 5' 58' 47.8" (LT)	Os = 3' 06' 42.3"
Ls = 252.00'	D = 2' 28' 10.7"	Ls = 252.00'
LT = 168.03'	L = 242.14'	LT = 168.03'
ST = 84.02'	T = 121.18'	ST = 84.02'
	R = 2,320.00'	
	Ds = 65mph	
	SE = 0.06	
	RUNOFF = 252'	



MATCH LINE -Y8- STA. 23+00.00 SEE SHEET 28

MATCH LINE -Y8- STA. 34+50.00 SEE SHEET 25

UNDIVIDED COASTAL PLAIN

UNDIVIDED COASTAL PLAIN

ROADWAY EMBANKMENT

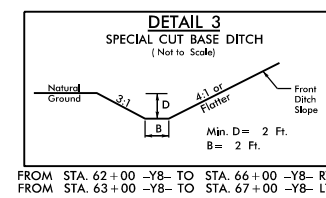
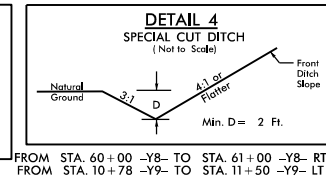
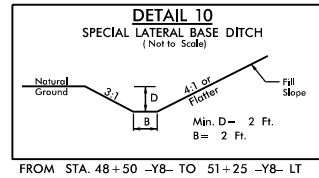
SR 1835 (GRANGER STATION RD) 19' BST

NO ASSOCIATED PILING FOUND

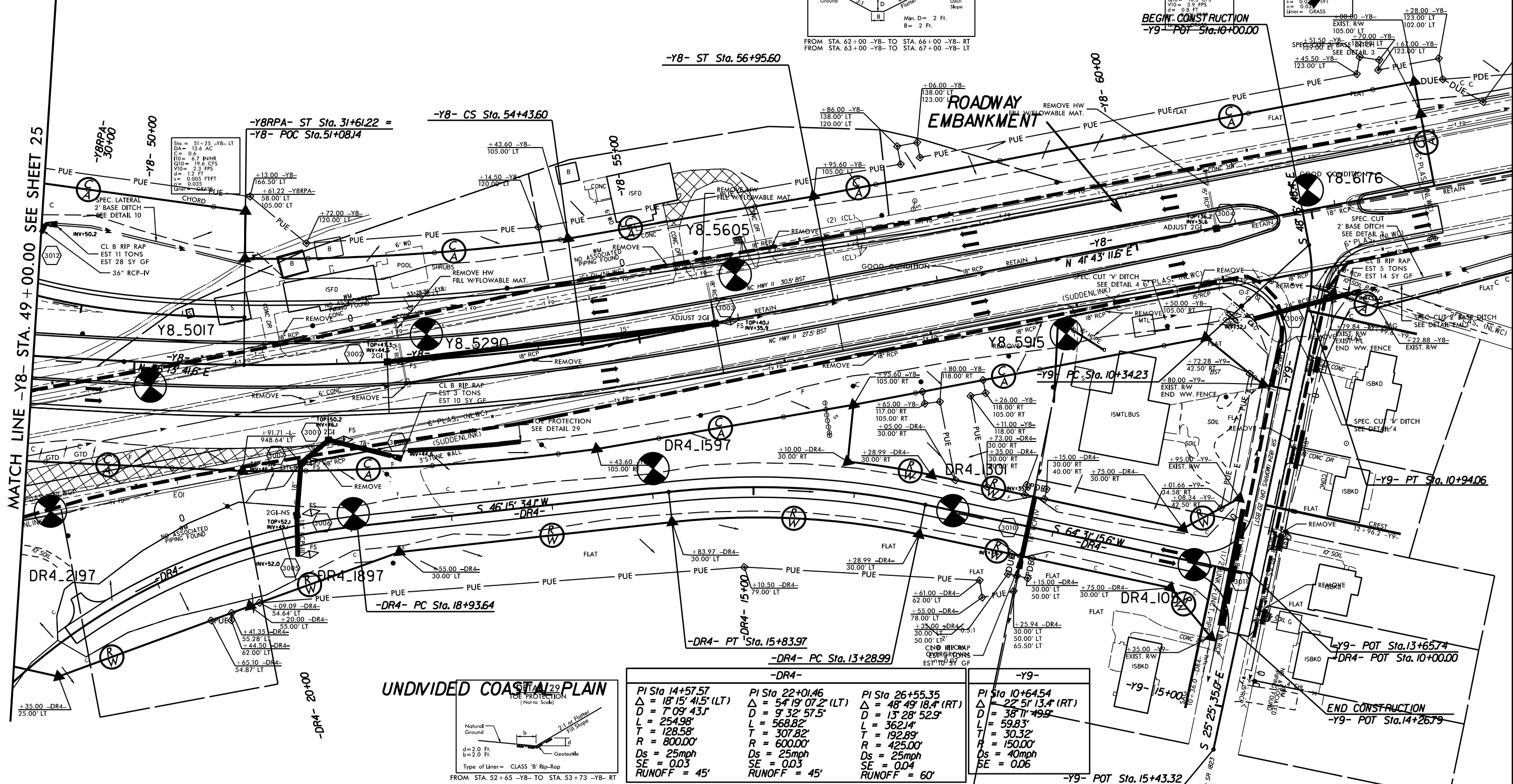


PROJECT REFERENCE NO.	SHEET NO.
R-5703	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

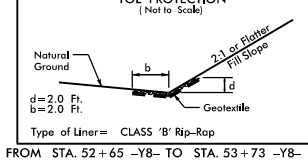
-Y8-		
PI Sta 50+24.16	PI Sta 52+76.16	PI Sta 55+27.63
Δs = 3'06"42.3"	Δ = 8'17"05.4" (LT)	Δs = 3'06"42.3"
Ls = 252.00'	D = 2'28"10.7"	Ls = 252.00'
LT = 168.03'	L = 335.47'	LT = 168.03'
ST = 84.02'	T = 168.03'	ST = 84.02'
	R = 2,320.00'	
	Ds = 65mph	
	SE = 0.06	
	RUNOFF = 252'	



## UNDIVIDED COASTAL PLAIN



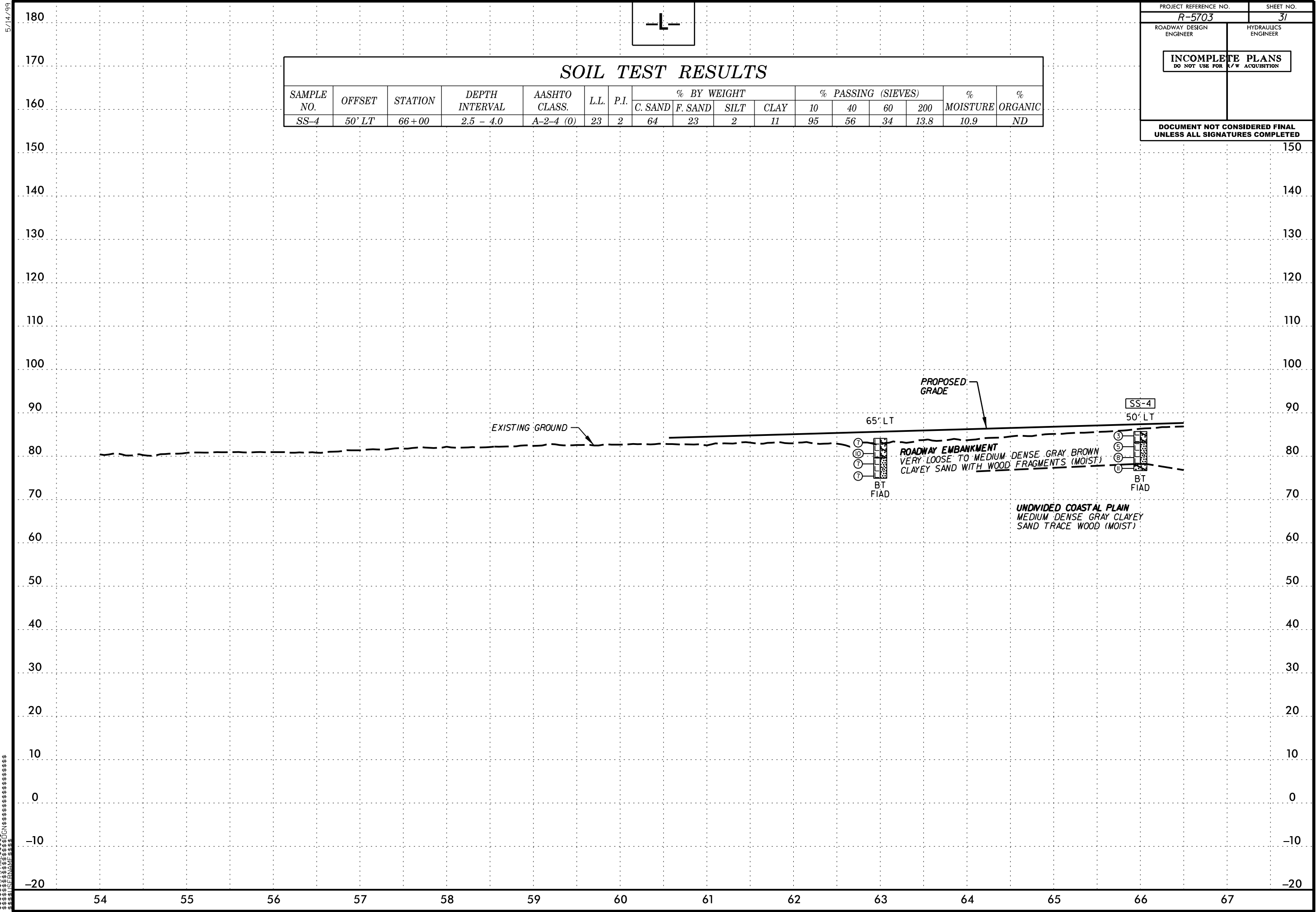
## UNDIVIDED COASTAL PLAIN



-Y8-		
PI Sta 14+57.57	PI Sta 22+01.46	PI Sta 26+55.35
Δ = 18'15"41.5" (LT)	Δ = 54'19"07.2" (LT)	Δ = 48'49"18.4" (RT)
D = 7'09"43.1"	D = 9'32"57.5"	D = 13'28"52.9"
L = 254.98'	L = 568.82'	L = 362.14'
T = 128.58'	T = 307.82'	T = 192.89'
R = 800.00'	R = 600.00'	R = 425.00'
Ds = 25mph	Ds = 25mph	Ds = 25mph
SE = 0.03	SE = 0.03	SE = 0.04
RUNOFF = 45'	RUNOFF = 45'	RUNOFF = 60'

-Y9-	
PI Sta 10+64.54	PI Sta 10+64.54
Δ = 22'51"13.4" (RT)	Δ = 22'51"13.4" (RT)
D = 38'11"49.9"	D = 38'11"49.9"
L = 59.83'	L = 59.83'
T = 30.32'	T = 30.32'
R = 150.00'	R = 150.00'
Ds = 40mph	Ds = 40mph
SE = 0.06	SE = 0.06

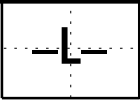
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SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-4	50' LT	66+00	2.5 - 4.0	A-2-4 (0)	23	2	64	23	2	11	95	56	34	13.8	10.9	ND

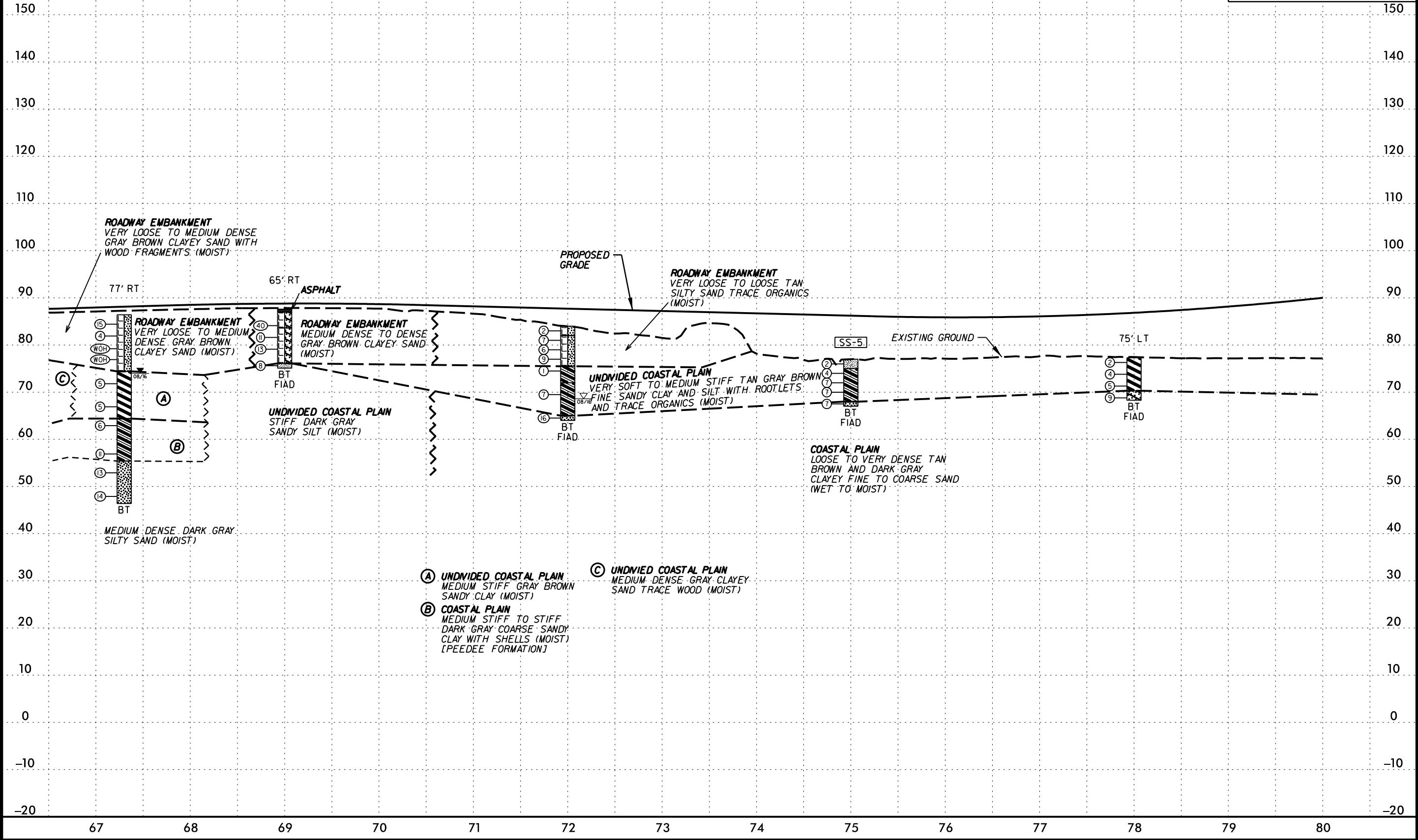
PROJECT REFERENCE NO.	SHEET NO.
<i>R-5703</i>	<i>31</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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<b>DOCUMENT NOT CONSIDERED FINAL          UNLESS ALL SIGNATURES COMPLETED</b>	

5/14/99  
TIME  
DESIGN

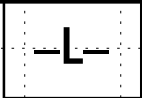


PROJECT REFERENCE NO. <b>R-5703</b>		SHEET NO. <b>32</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION		
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED		

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-5	CL	75+00	2.0 - 3.5	A-6 (7)	37	21	20	31	15	34	98	89	78	51.0	25.1	ND



5/14/99



PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**33**

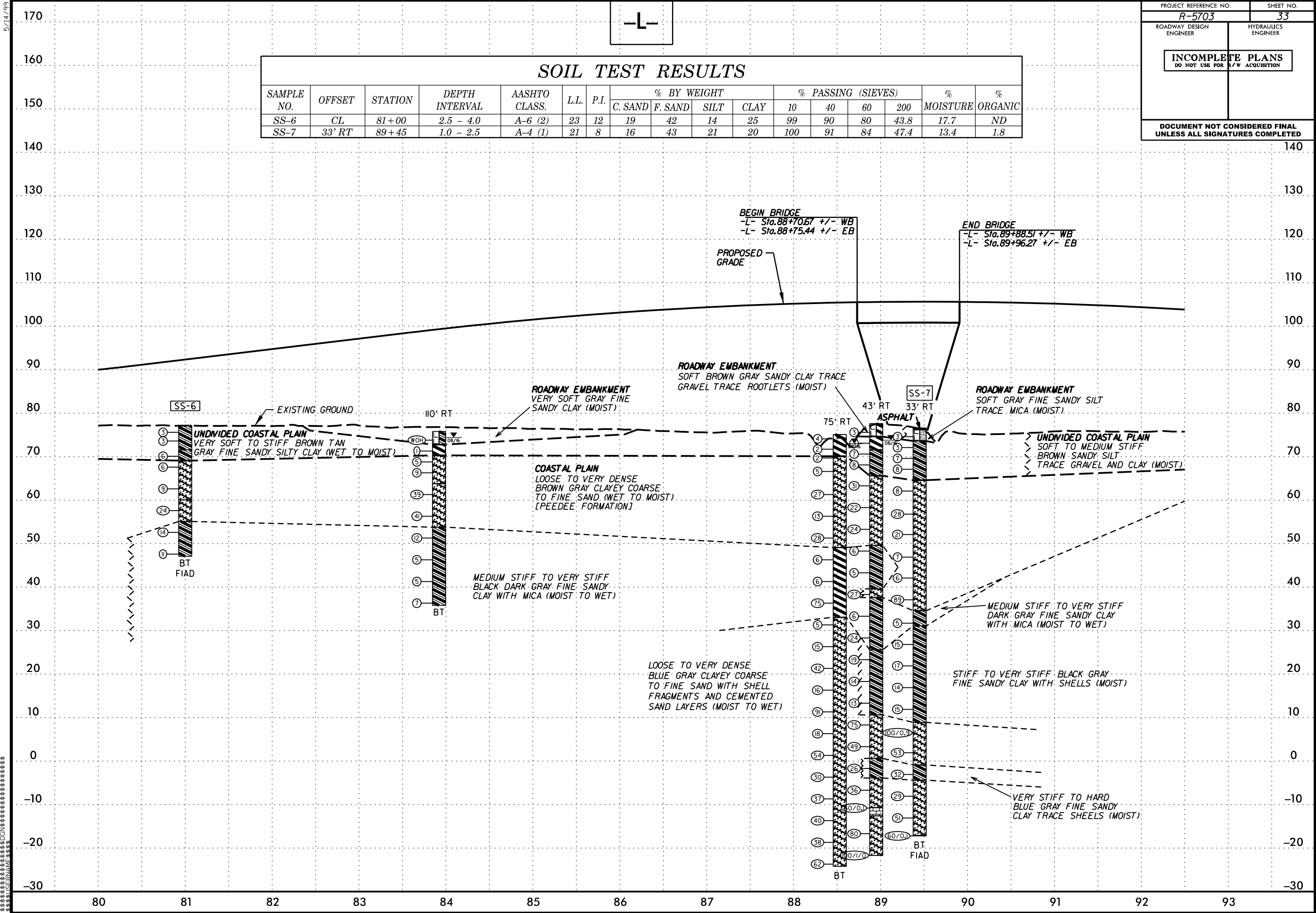
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION

**DOCUMENT NOT CONSIDERED FINAL**  
UNLESS ALL SIGNATURES COMPLETED

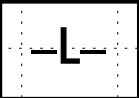
SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-6	CL	81+00	2.5 - 4.0	A-6 (2)	23	12	19	42	14	25	99	90	80	43.8	17.7	ND
SS-7	33' RT	89+45	1.0 - 2.5	A-4 (1)	21	8	16	43	21	20	100	91	84	47.4	13.4	1.8



\$\$\$\$\$SYTIME\$\$\$\$\$  
\$\$\$\$\$DESIGN\$\$\$\$\$  
\$\$\$\$\$DRAWING\$\$\$\$\$

5/14/99

SECTION CUT



SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-8	CL	93+00	4.0 - 5.5	A-4 (0)	22	5	19	45	14	22	99	89	80	41.6	17.7	ND
SS-9	CL	99+00	2.5 - 4.0	A-4 (0)	20	5	17	50	18	15	97	87	81	37.5	16.5	ND
SS-10	CL	105+00	0.5 - 2.0	A-4 (2)	30	9	22	32	25	21	99	86	77	48.7	45.4	ND

PROJECT REFERENCE NO.  
R-5703

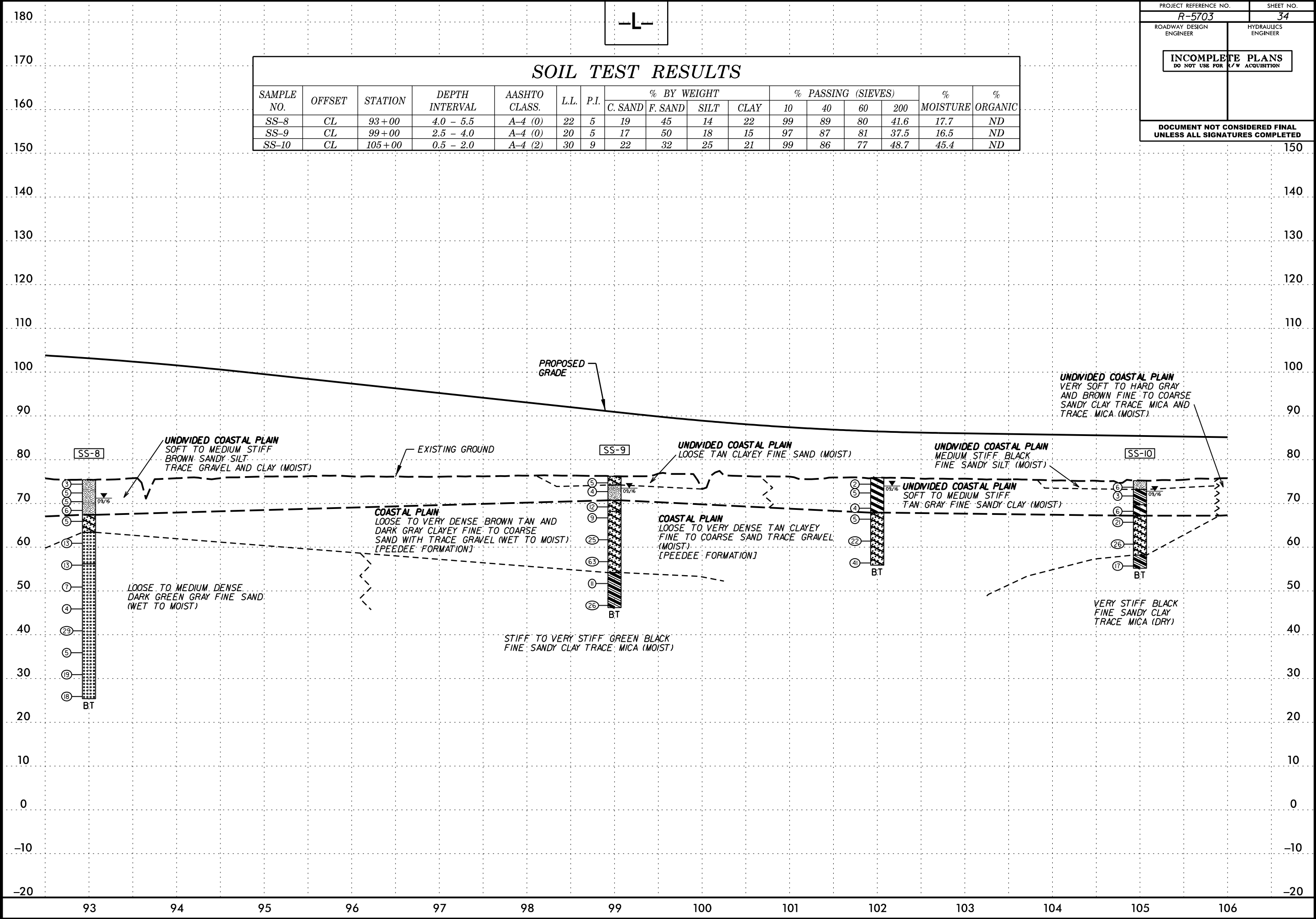
SHEET NO.  
34

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

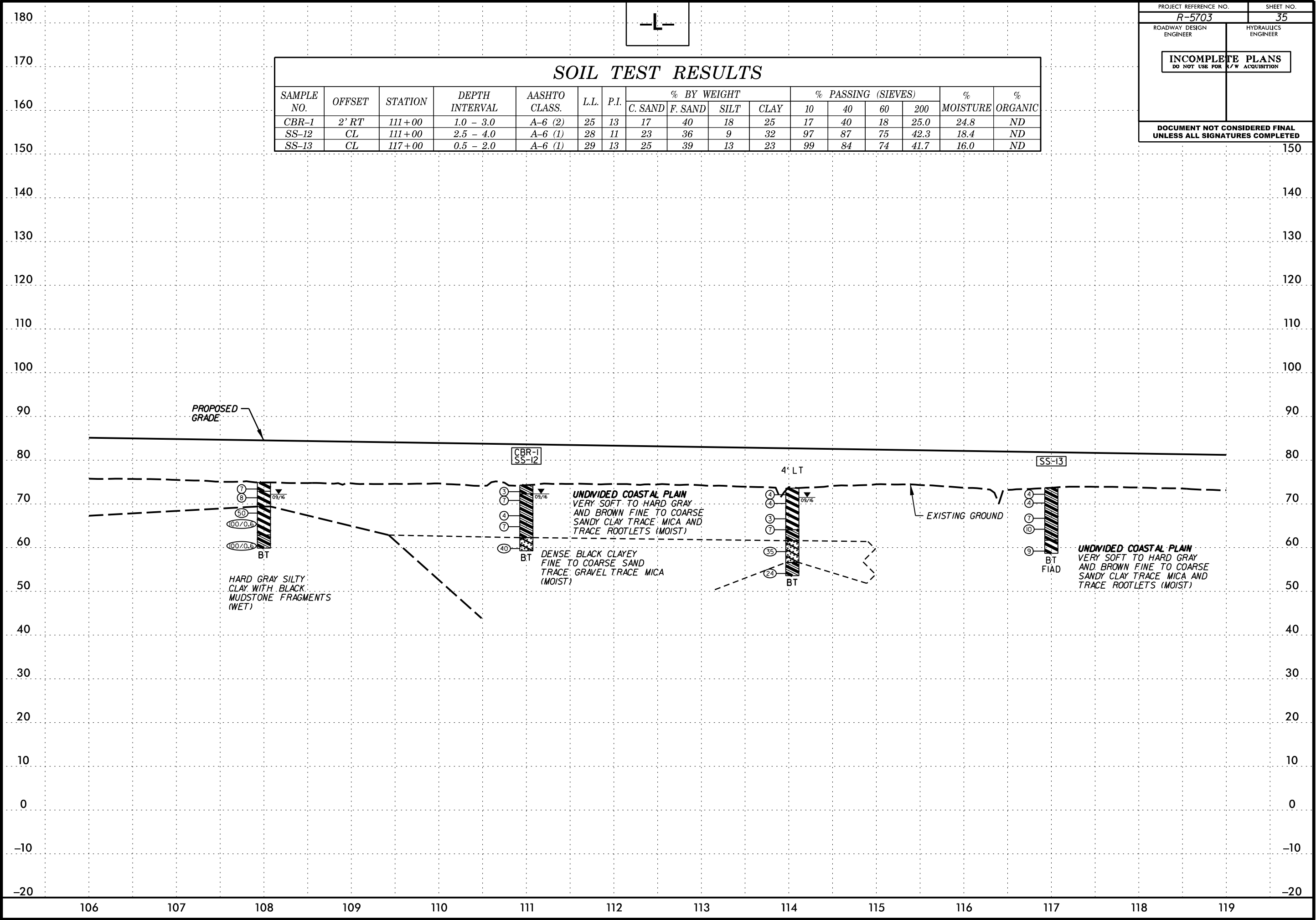
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



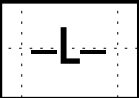
PROJECT REFERENCE NO.	SHEET NO.
<i>R-5703</i> ROADWAY DESIGN ENGINEER	35 HYDRAULICS ENGINEER
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<b>DO NOT CONSIDERED FINAL          WITHOUT ALL SIGNATURES COMPLETED</b>	

## SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
CBR-1	2' RT	111+00	1.0 - 3.0	A-6 (2)	25	13	17	40	18	25	17	40	18	25.0	24.8	ND
SS-12	CL	111+00	2.5 - 4.0	A-6 (1)	28	11	23	36	9	32	97	87	75	42.3	18.4	ND
SS-13	CL	117+00	0.5 - 2.0	A-6 (1)	29	13	25	39	13	23	99	84	74	41.7	16.0	ND



5/14/99



SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-14	CL	126+00	0.5 - 2.0	A-6 (2)	29	14	39	19	12	30	39	19	12	30.0	17.2	ND

PROJECT REFERENCE NO.  
*R-5703*

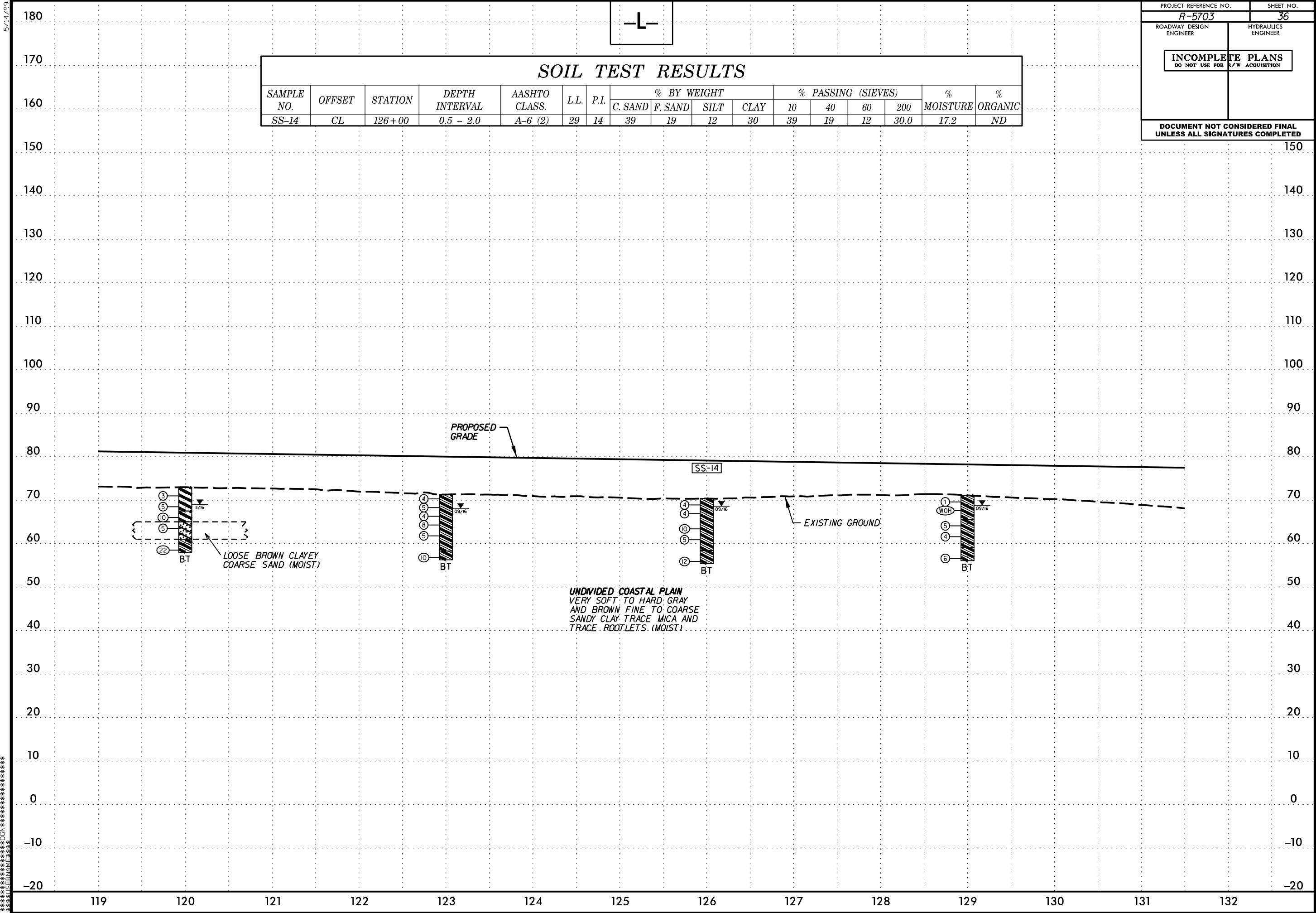
SHEET NO.  
*36*

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

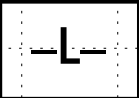
INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



5/14/99

SECTION CUT



SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-15	CL	135+00	2.5 - 4.0	A-6 (3)	26	12	20	35	15	30	100	87	80	49.4	21.8	ND
SS-16	CL	144+00	2.0 - 3.5	A-6 (5)	32	17	21	32	18	29	10	83	79	50.8	17.7	ND

PROJECT REFERENCE NO.  
R-5703

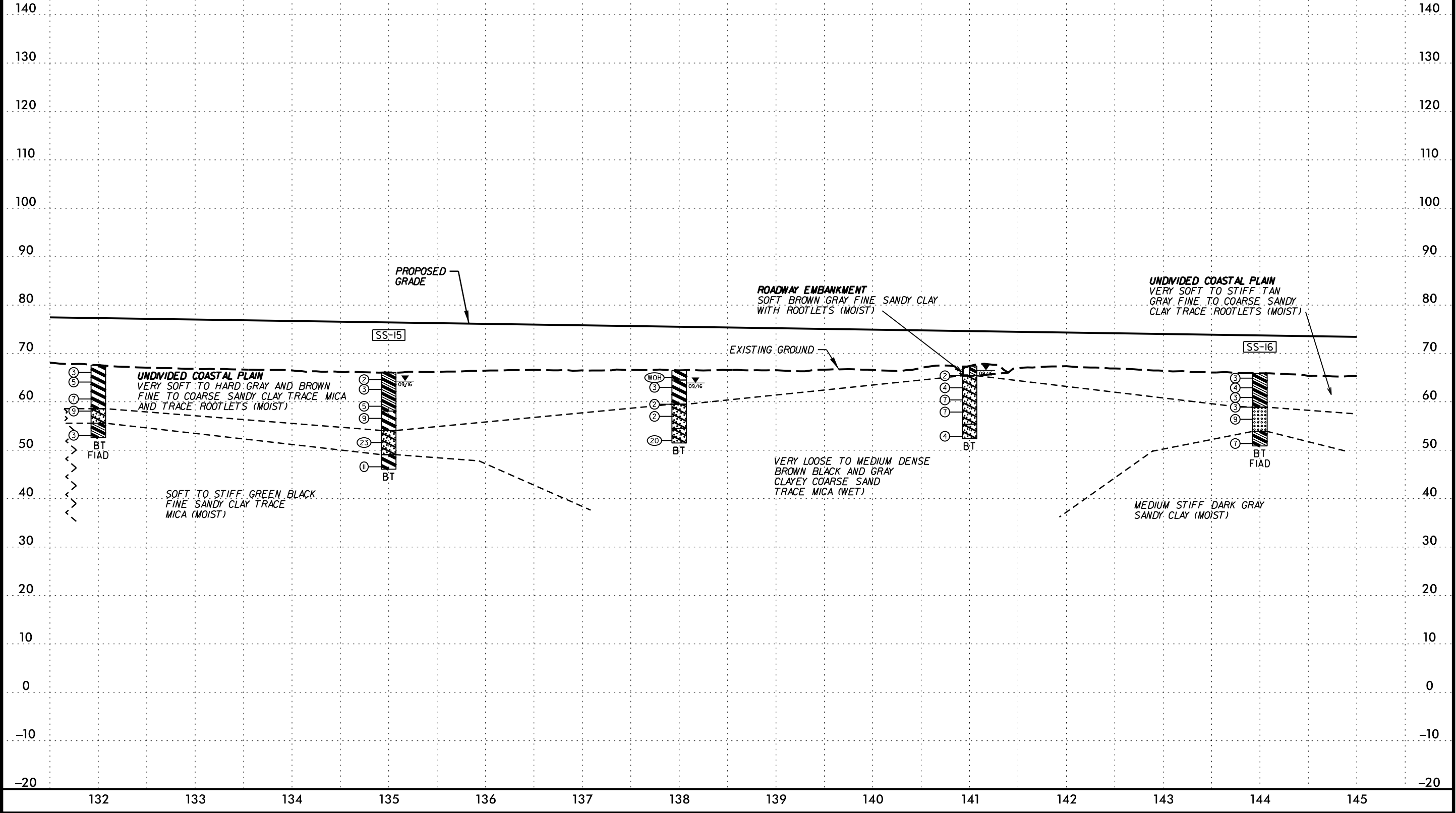
SHEET NO.  
37

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

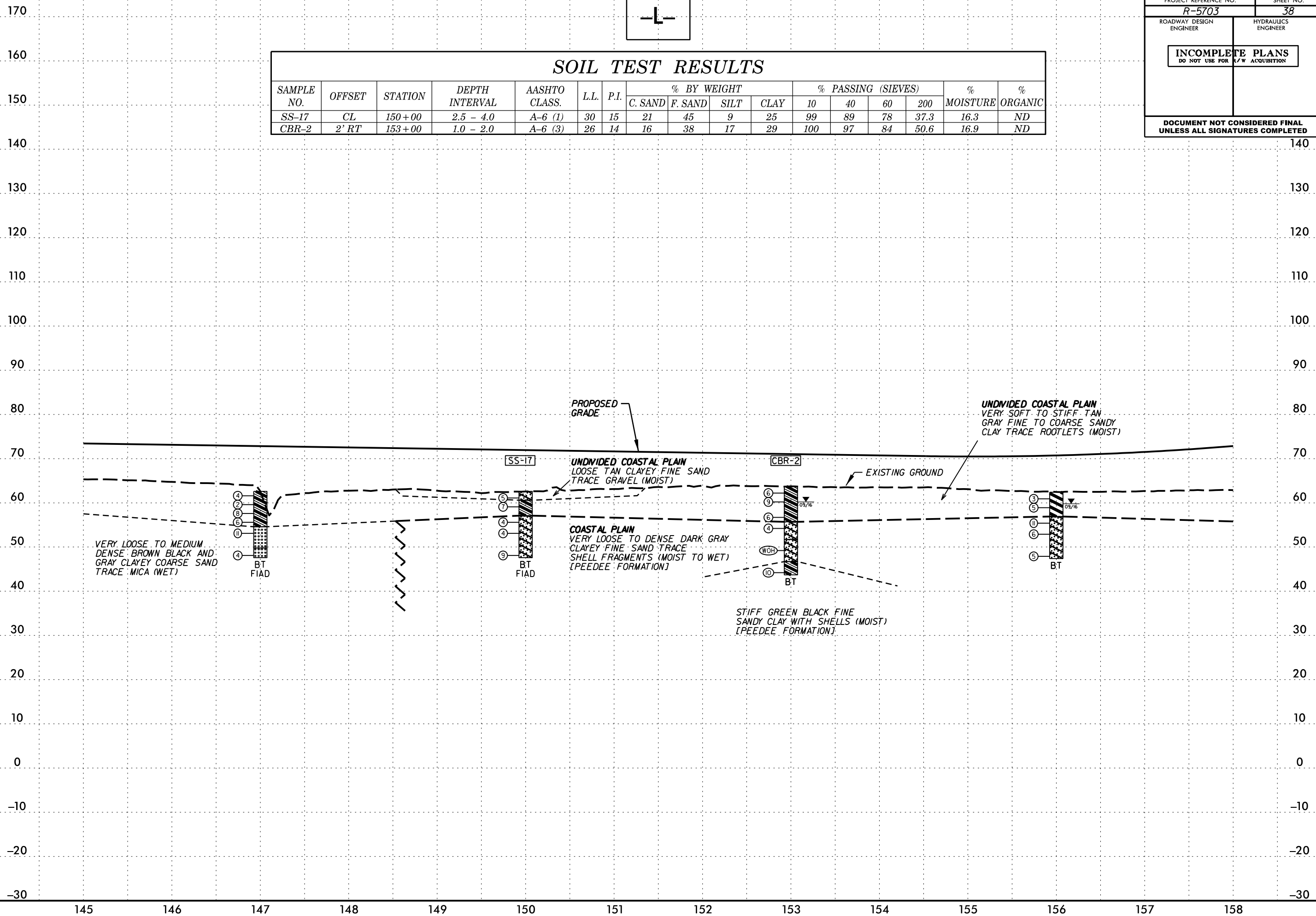




**HYDRAULICS  
ENGINEER**

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-17	CL	150+00	2.5 - 4.0	A-6 (1)	30	15	21	45	9	25	99	89	78	37.3	16.3	ND
CBR-2	2' RT	153+00	1.0 - 2.0	A-6 (3)	26	14	16	38	17	29	100	97	84	50.6	16.9	ND

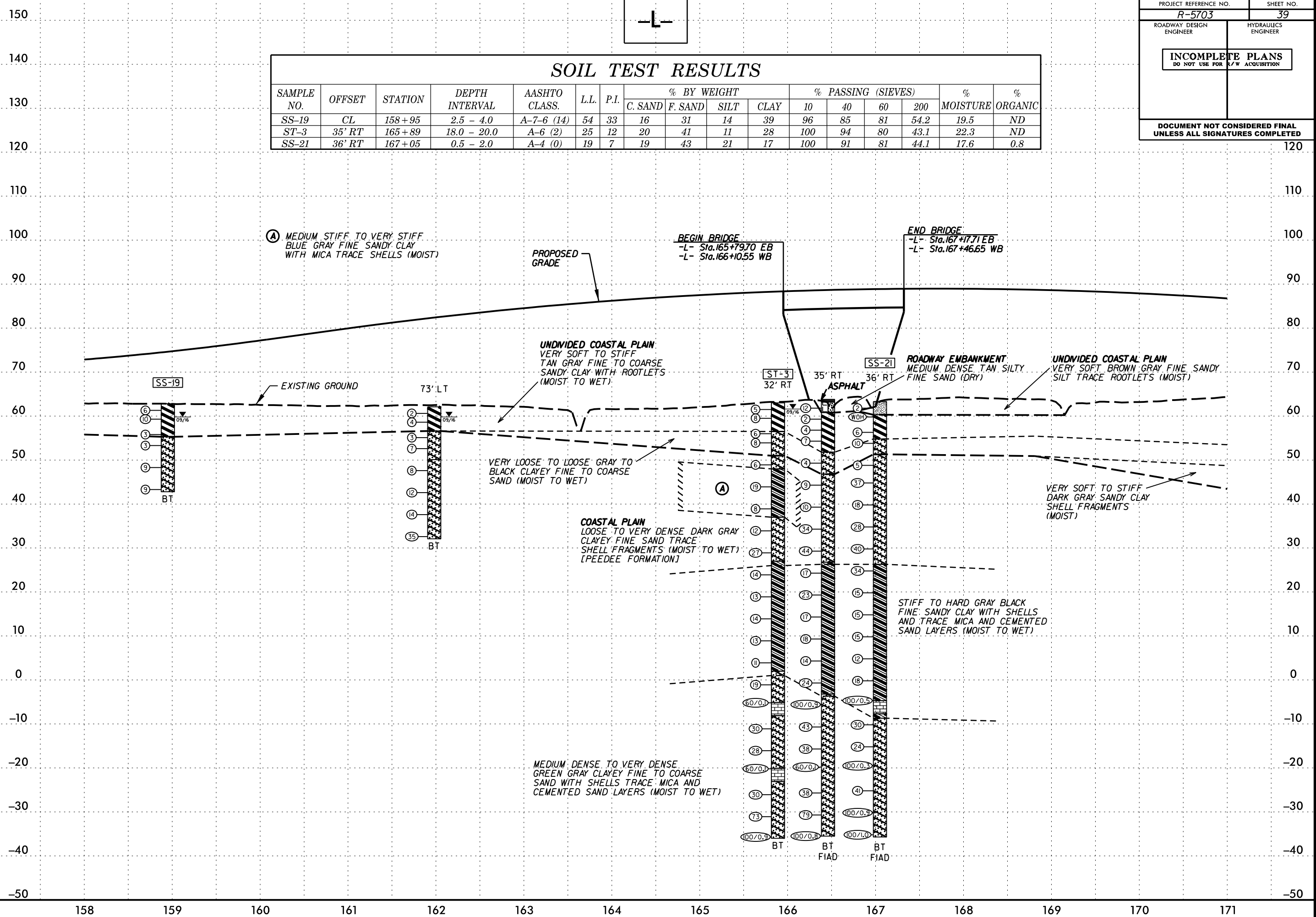


HYDRAULICS  
ENGINEER

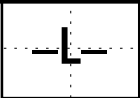
DO NOT USE FOR R/W ACQUISITION

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-19	CL	158 + 95	2.5 - 4.0	A-7-6 (14)	54	33	16	31	14	39	96	85	81	54.2	19.5	ND
ST-3	35' RT	165 + 89	18.0 - 20.0	A-6 (2)	25	12	20	41	11	28	100	94	80	43.1	22.3	ND
SS-21	36' RT	167 + 05	0.5 - 2.0	A-4 (0)	19	7	19	43	21	17	100	91	81	44.1	17.6	0.8



5/14/99



PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**40**

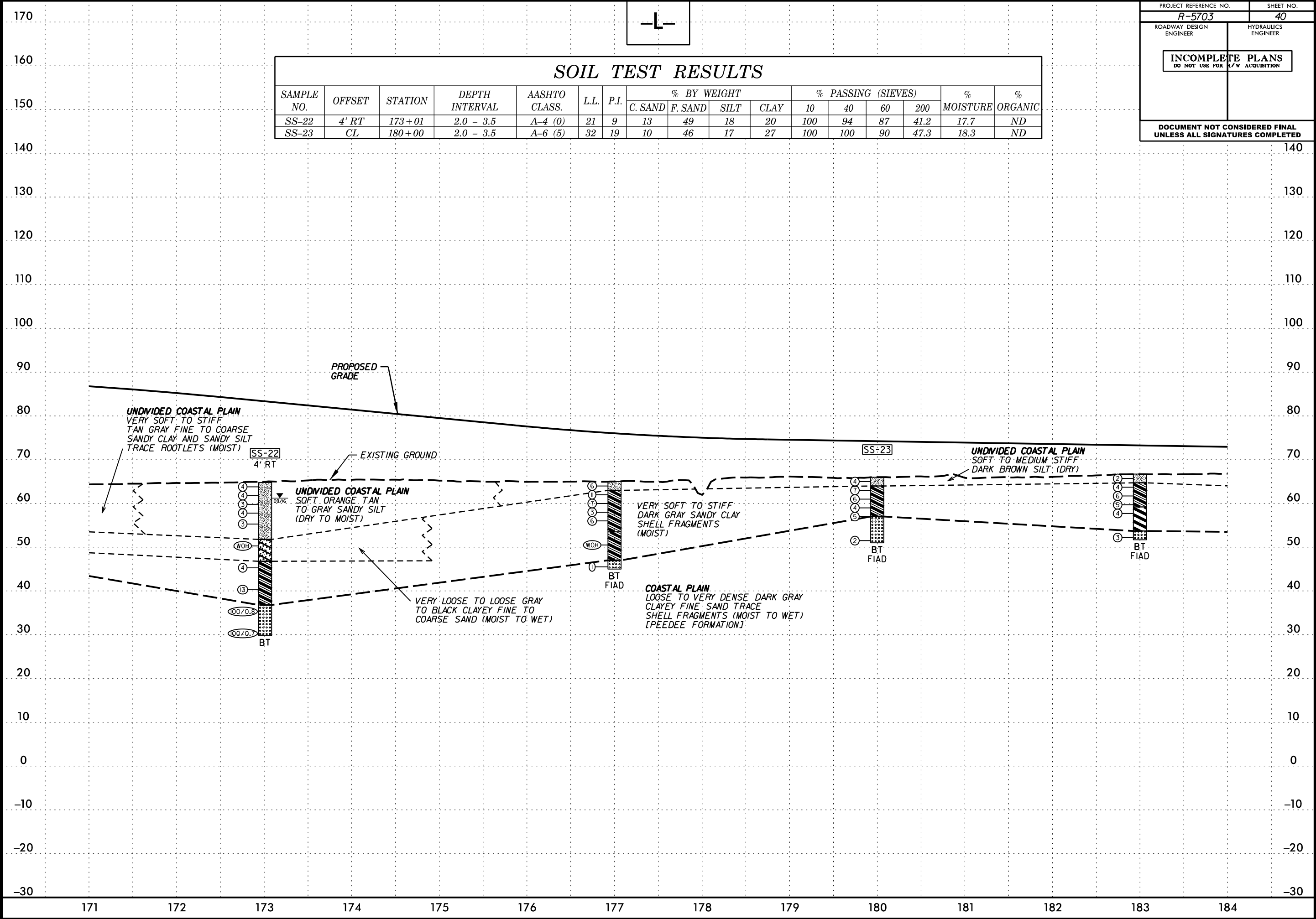
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION

**DOCUMENT NOT CONSIDERED FINAL**  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-22	4' RT	173+01	2.0 - 3.5	A-4 (0)	21	9	13	49	18	20	100	94	87	41.2	17.7	ND
SS-23	CL	180+00	2.0 - 3.5	A-6 (5)	32	19	10	46	17	27	100	100	90	47.3	18.3	ND



5/14/99

-L-

PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**41**

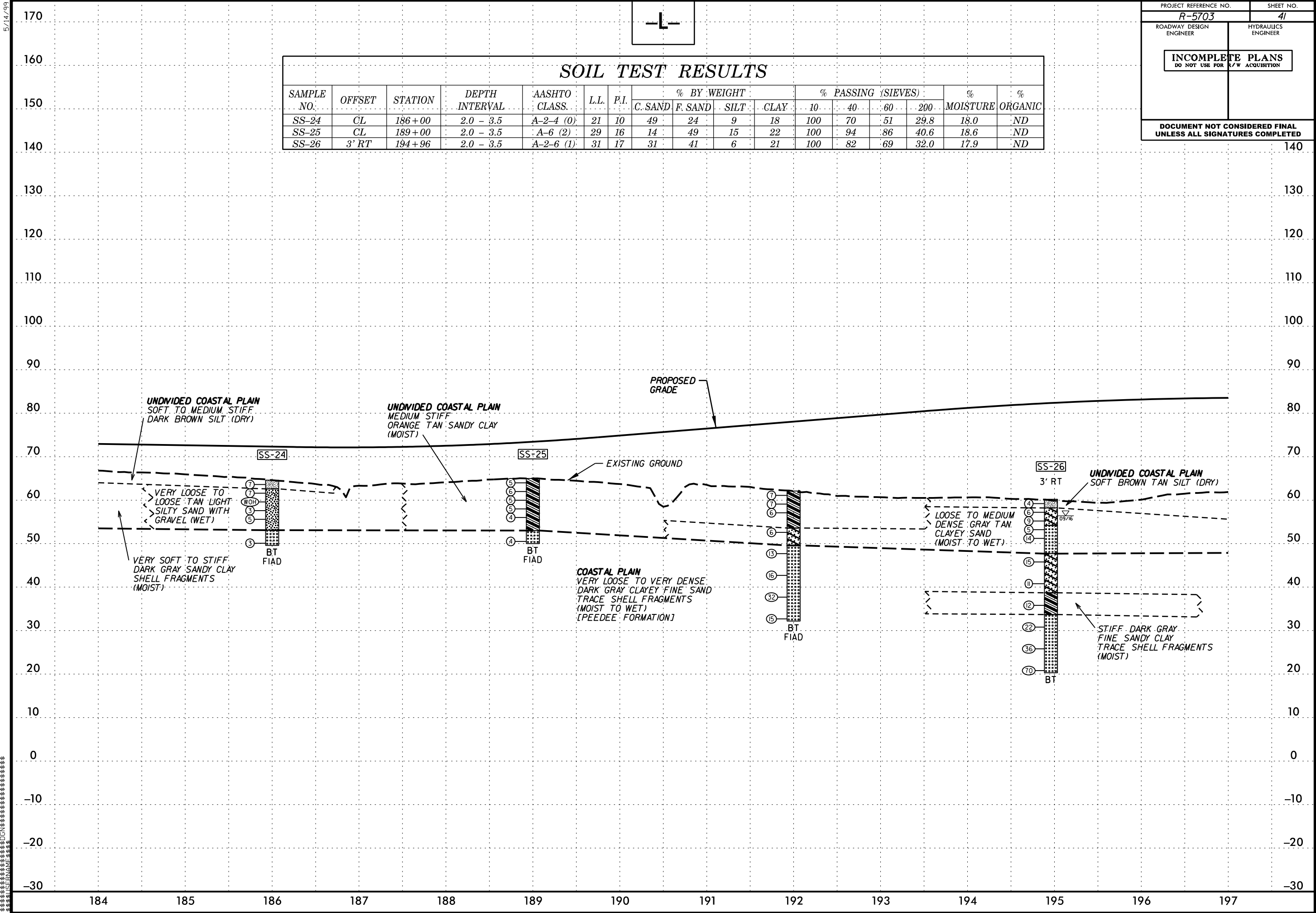
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-24	CL	186+00	2.0 - 3.5	A-2-4 (0)	21	10	49	24	9	18	100	70	51	29.8	18.0	ND
SS-25	CL	189+00	2.0 - 3.5	A-6 (2)	29	16	14	49	15	22	100	94	86	40.6	18.6	ND
SS-26	3' RT	194+96	2.0 - 3.5	A-2-6 (1)	31	17	31	41	6	21	100	82	69	32.0	17.9	ND



5/14/99

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PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**42**

ROADWAY DESIGN  
ENGINEER

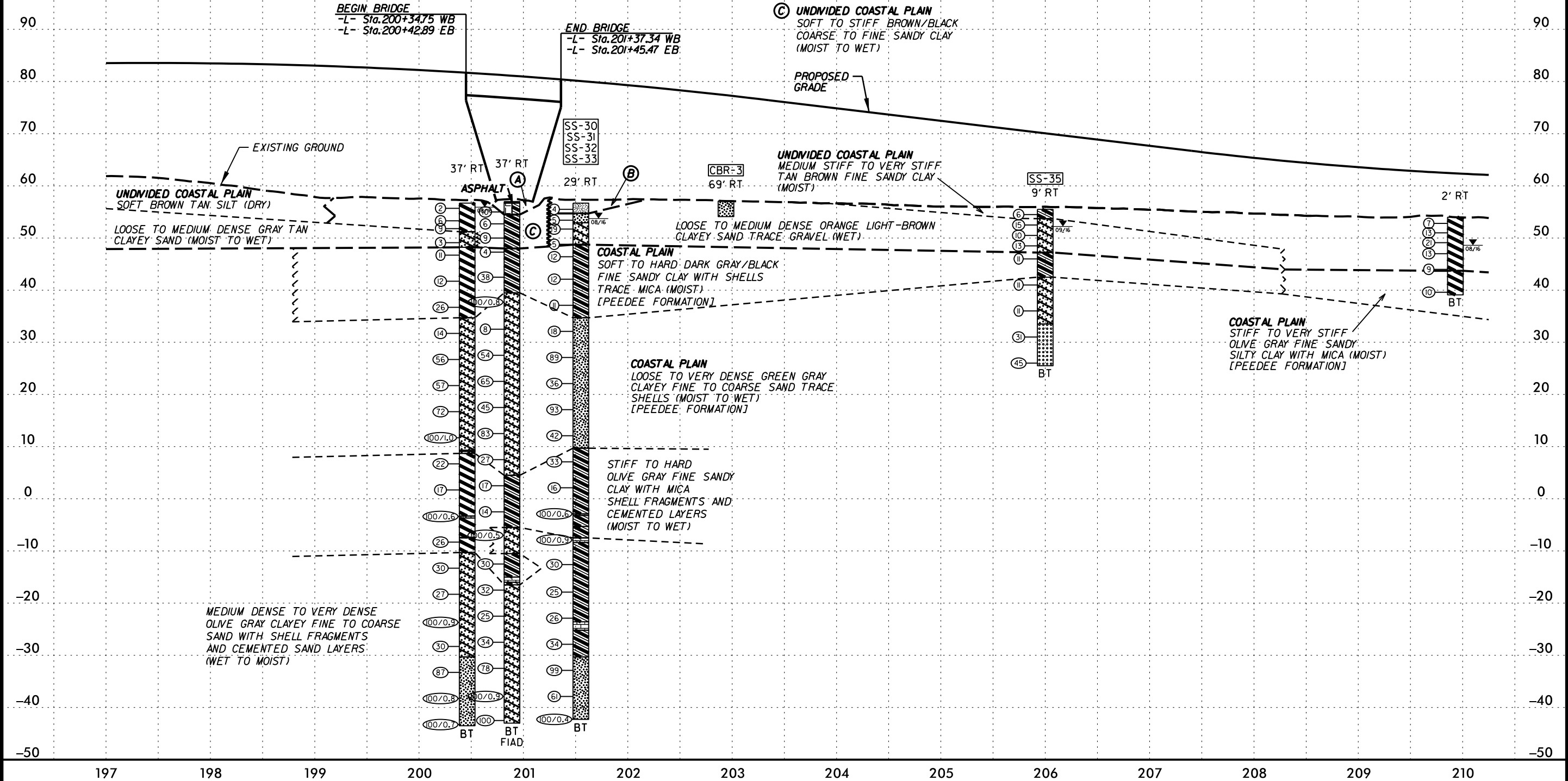
HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

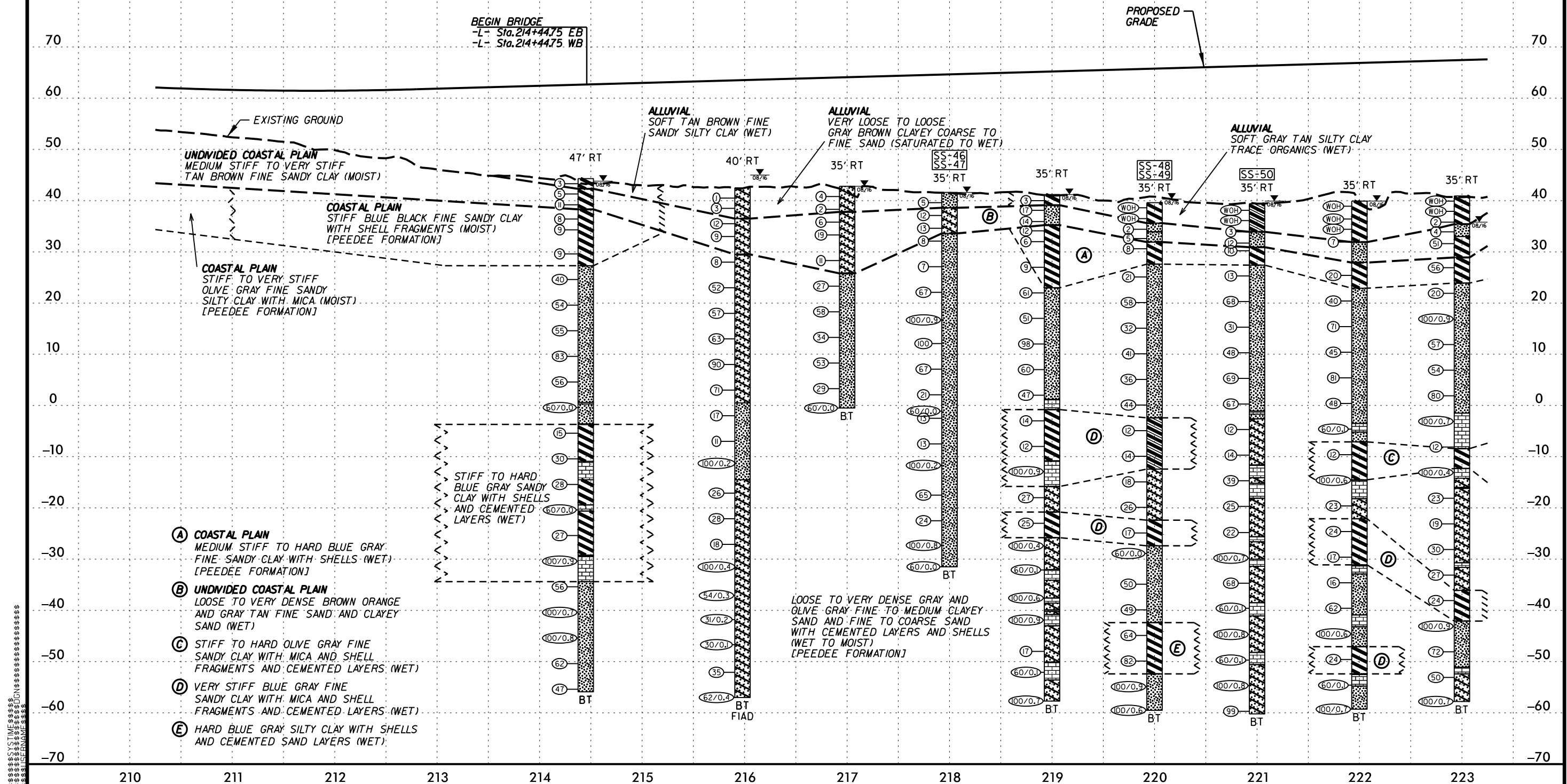
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-30	29' RT	201+55	0.2 - 1.7	A-4 (0)	18	8	23	40	16	21	99	89	76	39.6	11.6	ND
SS-31	29' RT	201+55	2.3 - 3.8	A-2-4 (0)	15	1	28	45	13	14	100	87	72	32.1	12.2	0.7
SS-32	29' RT	201+55	9.3 - 10.8	A-6 (3)	31	18	31	37	14	18	100	88	69	39.7	12.9	ND
SS-33	29' RT	201+55	48.6 - 50.1	A-6 (3)	33	16	25	38	10	27	100	91	75	41.2	20.3	1.8
SS-35	9' RT	206+00	2.0 - 3.5	A-2-6 (0)	33	19	64	12	2	22	100	78	36	24.7	14.8	ND
CBR-3	69' RT	202+94	1.0 - 3.0	A-2-4 (0)	13	NP	29	54	9	8	99	84	70	22.8	14.4	ND

- (A) ROADWAY EMBANKMENT  
MEDIUM STIFF TAN FINE SANDY CLAY (DRY TO MOIST)
- (B) UNDIVIDED COASTAL PLAIN  
SOFT TAN BROWN FINE SANDY SILT (MOIST)
- (C) UNDIVIDED COASTAL PLAIN  
SOFT TO STIFF BROWN/BLACK COARSE TO FINE SANDY CLAY (MOIST TO WET)



SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-46	35' RT	218+00	1.0 - 2.5	A-2-4 (0)	20	3	21	51	13	15	100	92	79	32.0	16.5	1.5
SS-47	35' RT	218+00	58.1 - 59.6	A-2-4 (0)	20	NP	38	51	5	6	100	90	62	13.2	27.1	0.7
SS-48	35' RT	220+00	4.2 - 5.7	A-2-4 (0)	22	9	32	39	16	13	100	84	68	31.1	24.4	ND
SS-49	35' RT	220+00	48.5 - 50.0	A-6 (3)	28	12	15	32	29	19	95	92	80	52.7	24.0	ND
SS-50	35' RT	221+00	0.3 - 1.8	A-6 (8)	40	11	10	20	35	35	100	97	90	74.2	70.2	ND



5/14/99

-L-

PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**44**

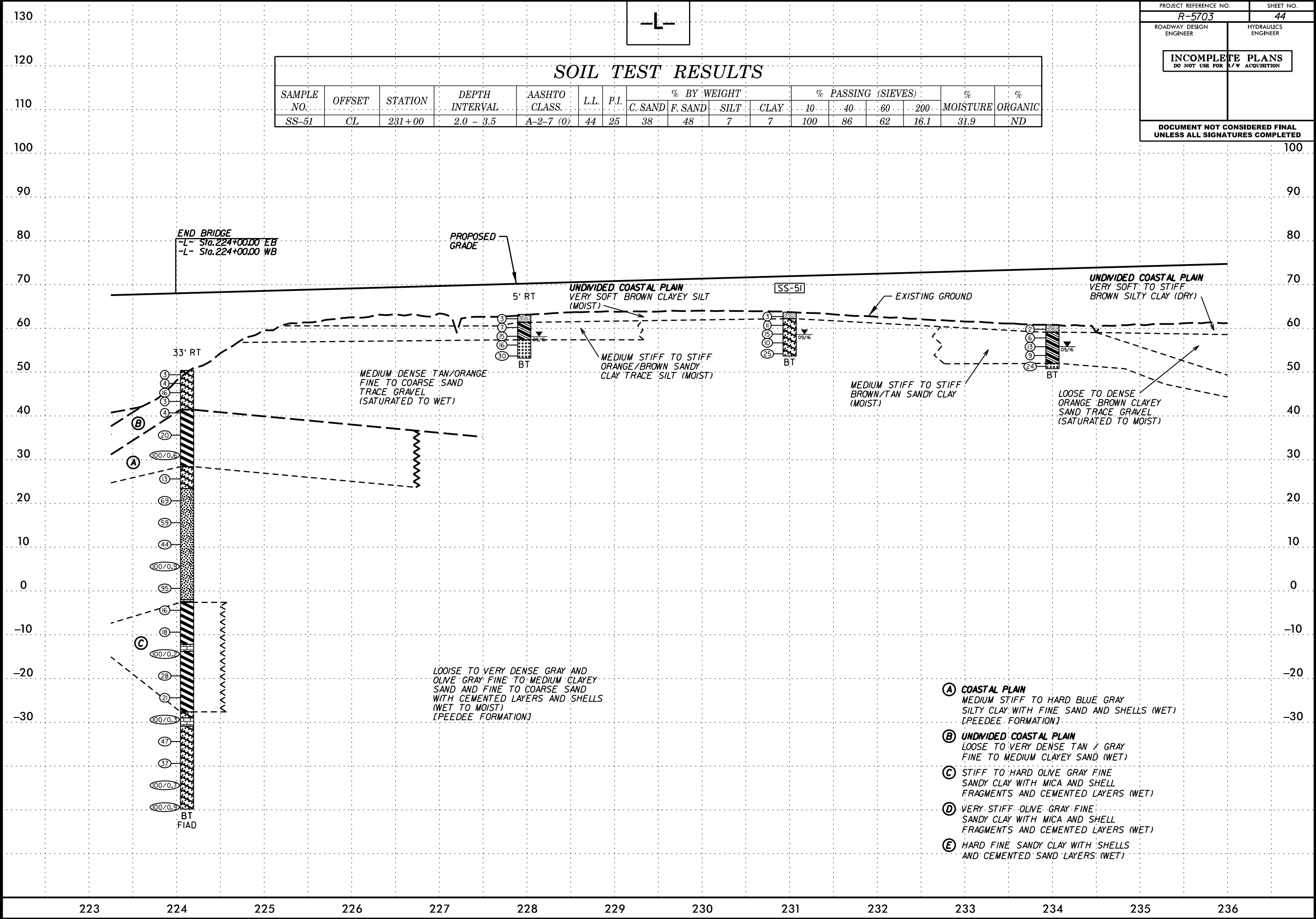
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

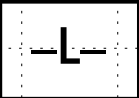
**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION

**DOCUMENT NOT CONSIDERED FINAL**  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-51	CL	231+00	2.0 - 3.5	A-2-7 (0)	44	25	38	48	7	7	100	86	62	16.1	31.9	ND



5/14/99



PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**45**

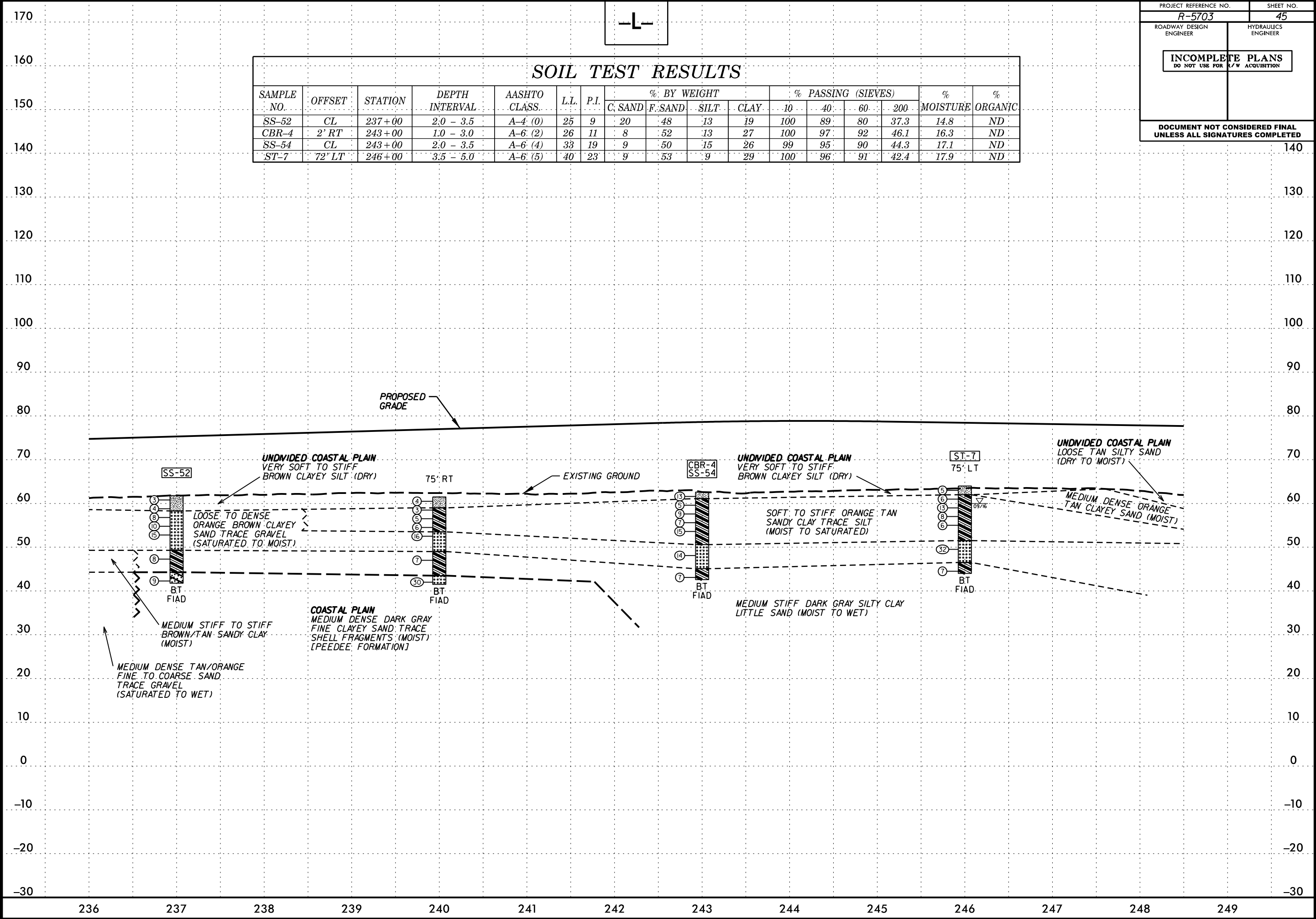
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION

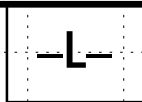
**DOCUMENT NOT CONSIDERED FINAL**  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-52	CL	237+00	2.0 - 3.5	A-4 (0)	25	9	20	48	13	19	100	89	80	37.3	14.8	ND
CBR-4	2' RT	243+00	1.0 - 3.0	A-6 (2)	26	11	8	52	13	27	100	97	92	46.1	16.3	ND
SS-54	CL	243+00	2.0 - 3.5	A-6 (4)	33	19	9	50	15	26	99	95	90	44.3	17.1	ND
ST-7	72' LT	246+00	3.5 - 5.0	A-6 (5)	40	23	9	53	9	29	100	96	91	42.4	17.9	ND



DESIGNED BY: J. L. HARRIS  
CHECKED BY: J. L. HARRIS  
DATE: 5/14/99

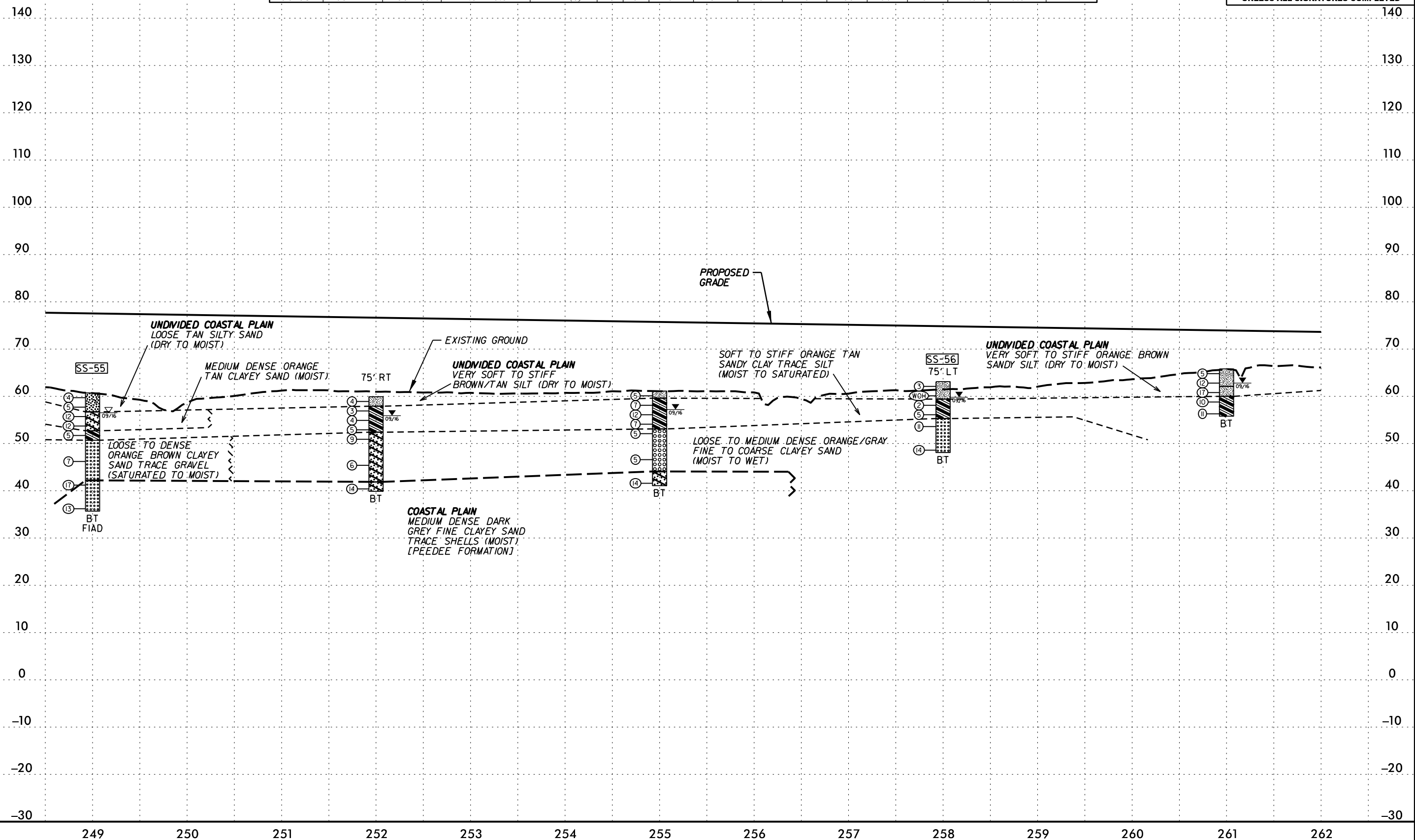




PROJECT REFERENCE NO.	SHEET NO.
<i>R-5703</i>	<i>46</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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<p style="text-align: center;"><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>	

## SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-55	CL	249+00	2.0 - 3.5	A-2-7 (3)	42	25	32	33	7	28	95	78	65	34.6	17.4	ND
SS-56	75' LT	258+00	2.0 - 3.5	A-4 (0)	18	5	9	54	17	20	100	97	91	42.3	17.3	ND

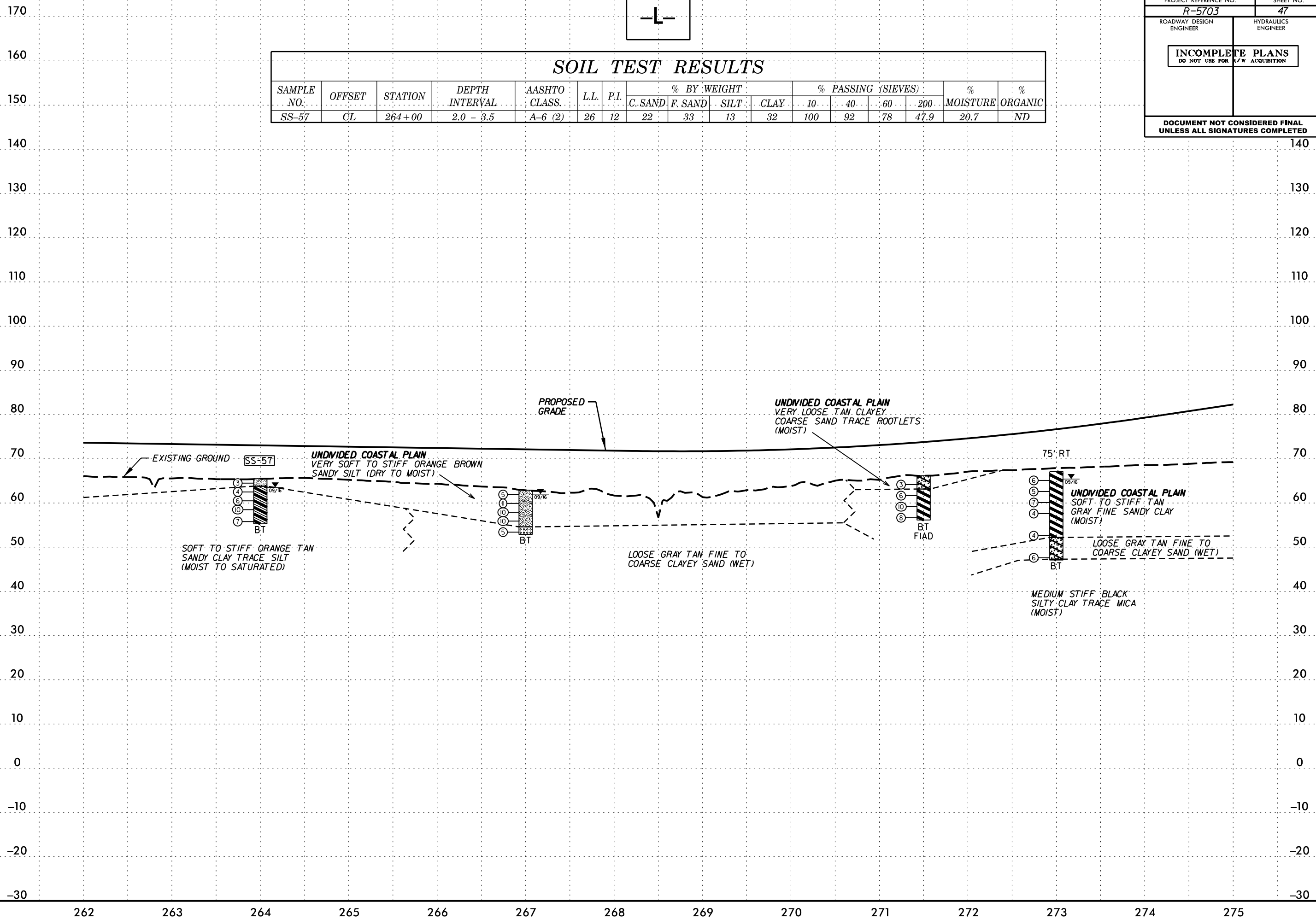


**HYDRAULICS  
ENGINEER**

DO NOT USE FOR R/W ACQUISITION

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-57	CL	264+00	2.0 - 3.5	A-6 (2)	26	12	22	33	13	32	100	92	78	47.9	20.7	ND



5/14/99

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PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**48**

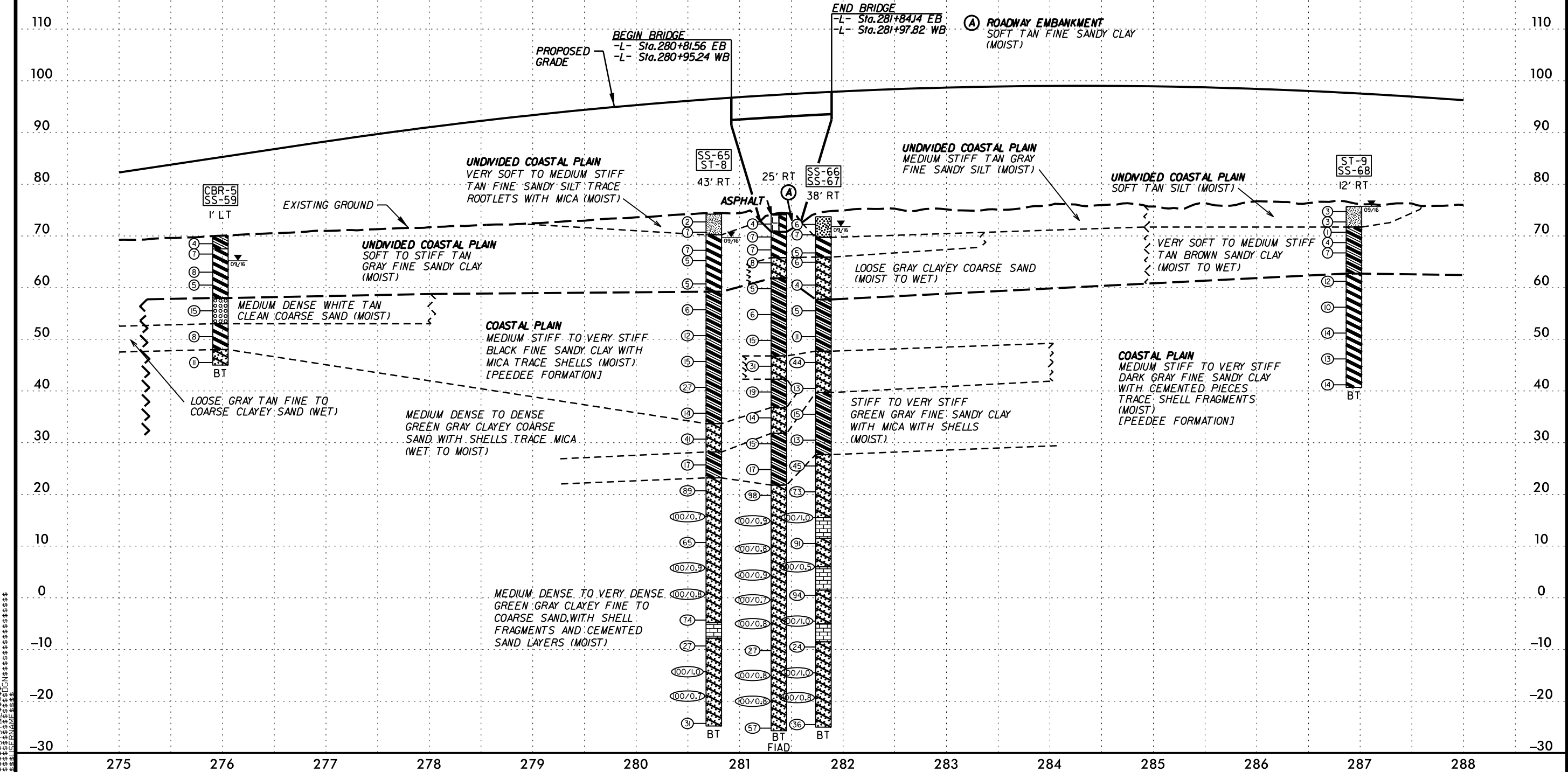
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
CBR-5	3' RT	275+98	1.0 - 3.0	A-6 (4)	28	14	10	39	21	30	100	99	90	54.5	17.5	ND
SS-59	1' LT	275+98	2.5 - 4.0	A-7-6 (8)	43	22	12	39	16	33	100	99	88	53.0	20.7	ND
SS-65	43' RT	280+75	0.5 - 2.0	A-4 (2)	22	10	8	47	23	22	100	99	92	50.3	15.8	1.4
ST-8	43' RT	280+75	15.0 - 17.0	A-6 (0)	37	11	4	67	8	21	100	97	96	36.0	36.7	ND
SS-66	38' RT	281+81	0.5 - 2.0	A-2-4 (0)	21	7	30	44	8	18	100	83	70	29.1	22.1	ND
SS-67	38' RT	281+81	32.2 - 33.7	A-2-6 (1)	31	18	49	23	9	19	99	70	50	30.3	17.9	ND
SS-68	12' RT	286+94	2.0 - 3.5	A-4 (1)	20	8	14	41	25	20	100	99	86	50.1	17.9	ND
ST-9	15' RT	286+94	4.1 - 6.0	A-6 (2)	28	13	14	45	17	24	100	99	86	44.9	20.9	ND



5/14/99

-L-

PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**49**

ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

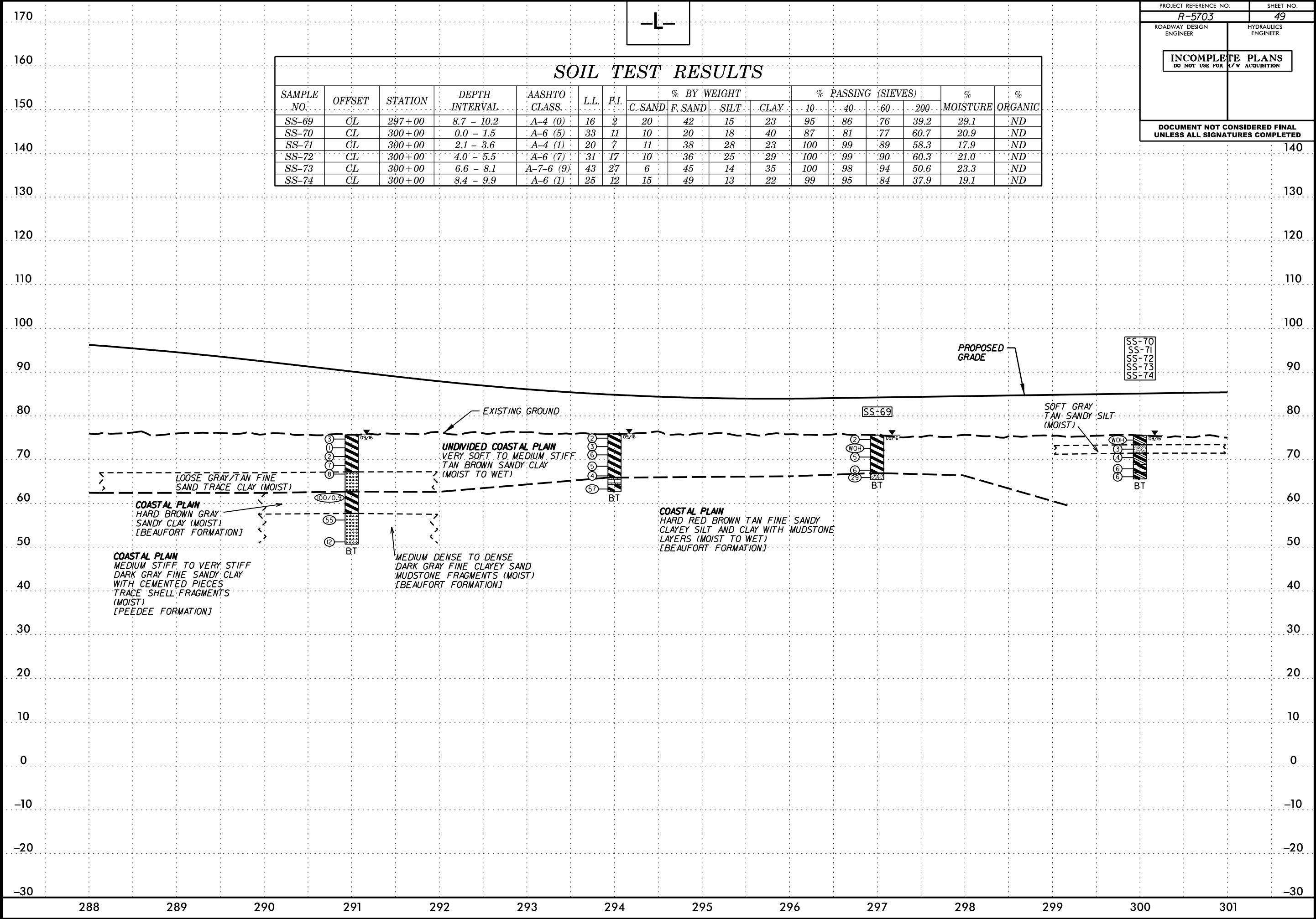
INCOMPLETE PLANS

DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-69	CL	297+00	8.7 - 10.2	A-4 (0)	16	2	20	42	15	23	95	86	76	39.2	29.1	ND
SS-70	CL	300+00	0.0 - 1.5	A-6 (5)	33	11	10	20	18	40	87	81	77	60.7	20.9	ND
SS-71	CL	300+00	2.1 - 3.6	A-4 (1)	20	7	11	38	28	23	100	99	89	58.3	17.9	ND
SS-72	CL	300+00	4.0 - 5.5	A-6 (7)	31	17	10	36	25	29	100	99	90	60.3	21.0	ND
SS-73	CL	300+00	6.6 - 8.1	A-7-6 (9)	43	27	6	45	14	35	100	98	94	50.6	23.3	ND
SS-74	CL	300+00	8.4 - 9.9	A-6 (1)	25	12	15	49	13	22	99	95	84	37.9	19.1	ND



5/14/99

5/14/99

-L-

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-75	CL	309+00	0.0 - 1.5	A-4 (0)	18	4	8	40	32	20	10	98	92	61.5	26.6	ND

PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**50**

ROADWAY DESIGN ENGINEER

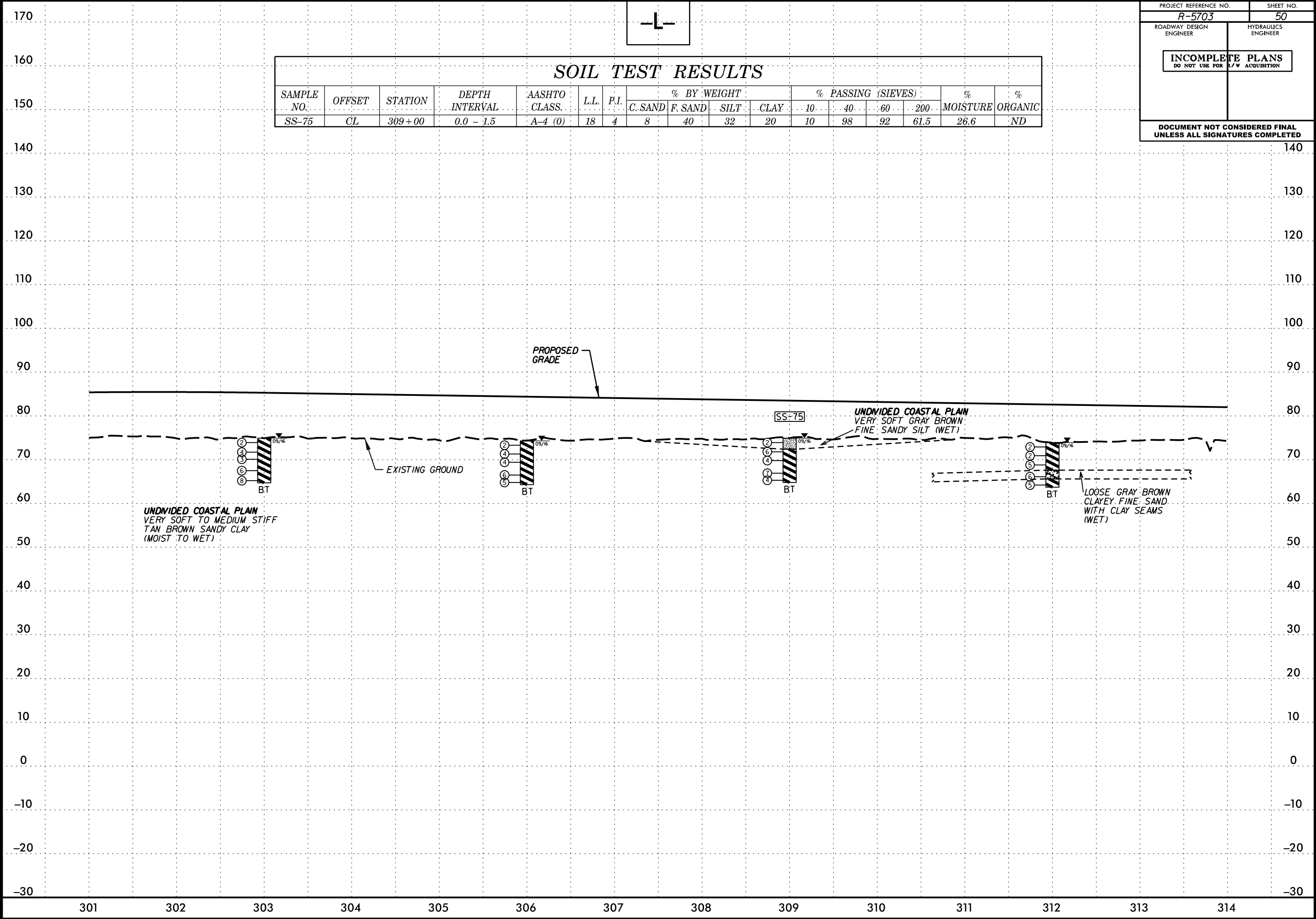
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INCOMPLETE PLANS

DO NOT USE FOR R/W ACQUISITION

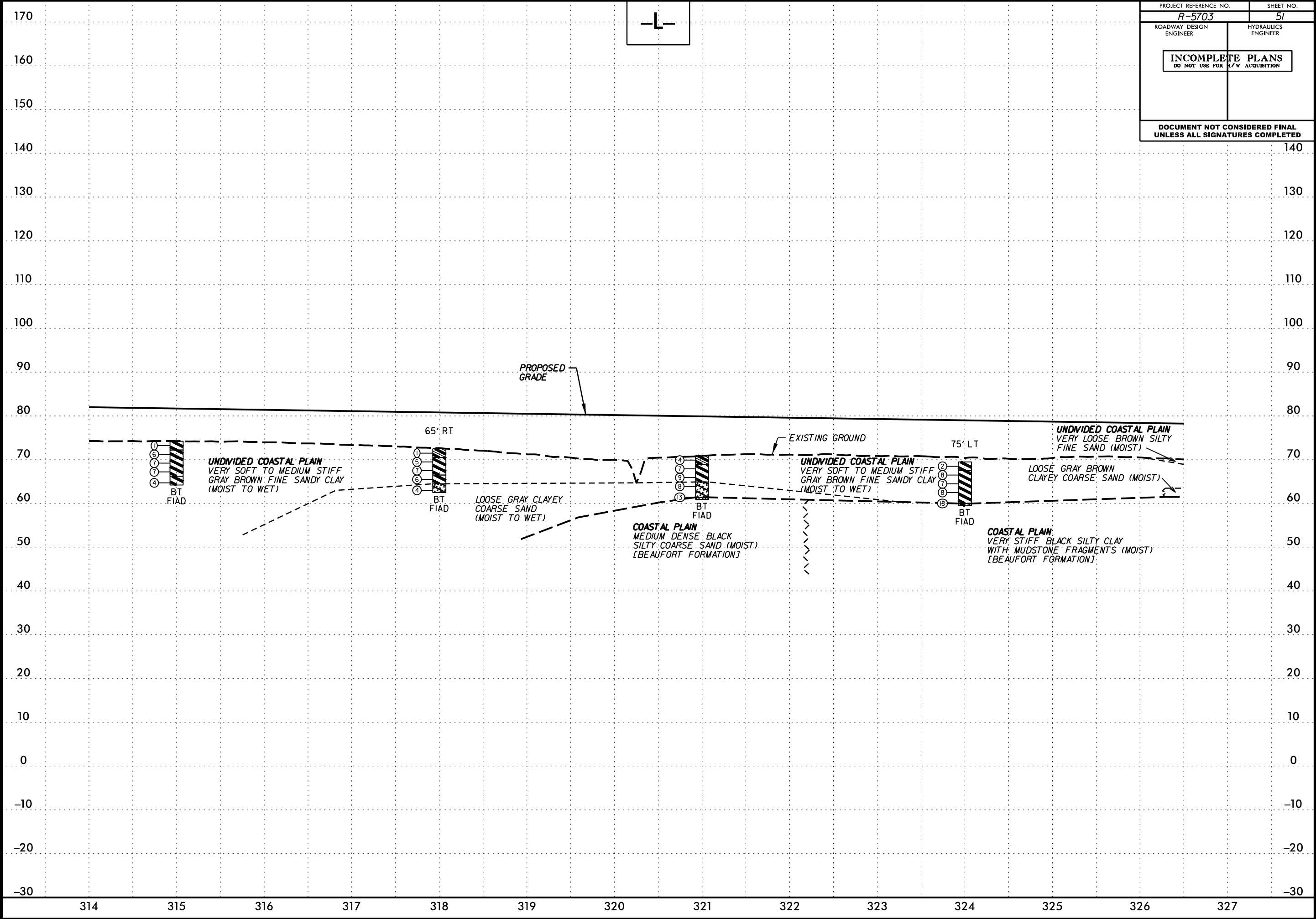
DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED



5/14/99

PROJECT REFERENCE NO.		SHEET NO.
R-5703		51
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



\$\$\$TIME\$\$\$\$\$  
\$\$\$DESIGN\$\$\$\$\$  
\$\$\$CHECK\$\$\$\$\$  
\$\$\$APPROVE\$\$\$\$\$  
\$\$\$DATE\$\$\$\$\$

5/14/99

-L-

PROJECT REFERENCE NO.  
R-5703

SHEET NO.  
52

ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

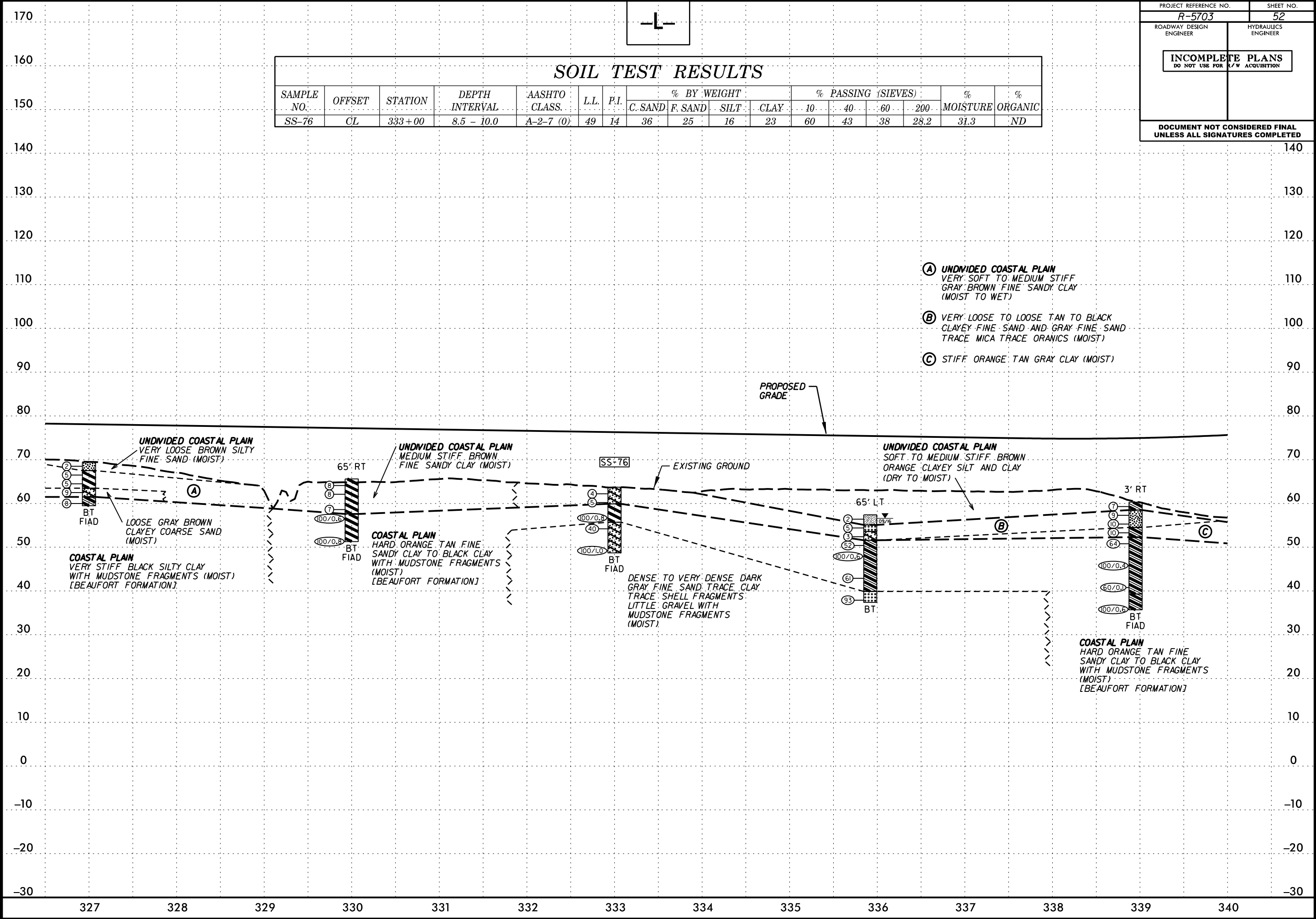
INCOMPLETE PLANS

DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-76	CL	333+00	8.5 - 10.0	A-2-7 (0)	49	14	36	25	16	23	60	43	38	28.2	31.3	ND



5/14/99

-L-

PROJECT REFERENCE NO.  
R-5703

SHEET NO.  
53

ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

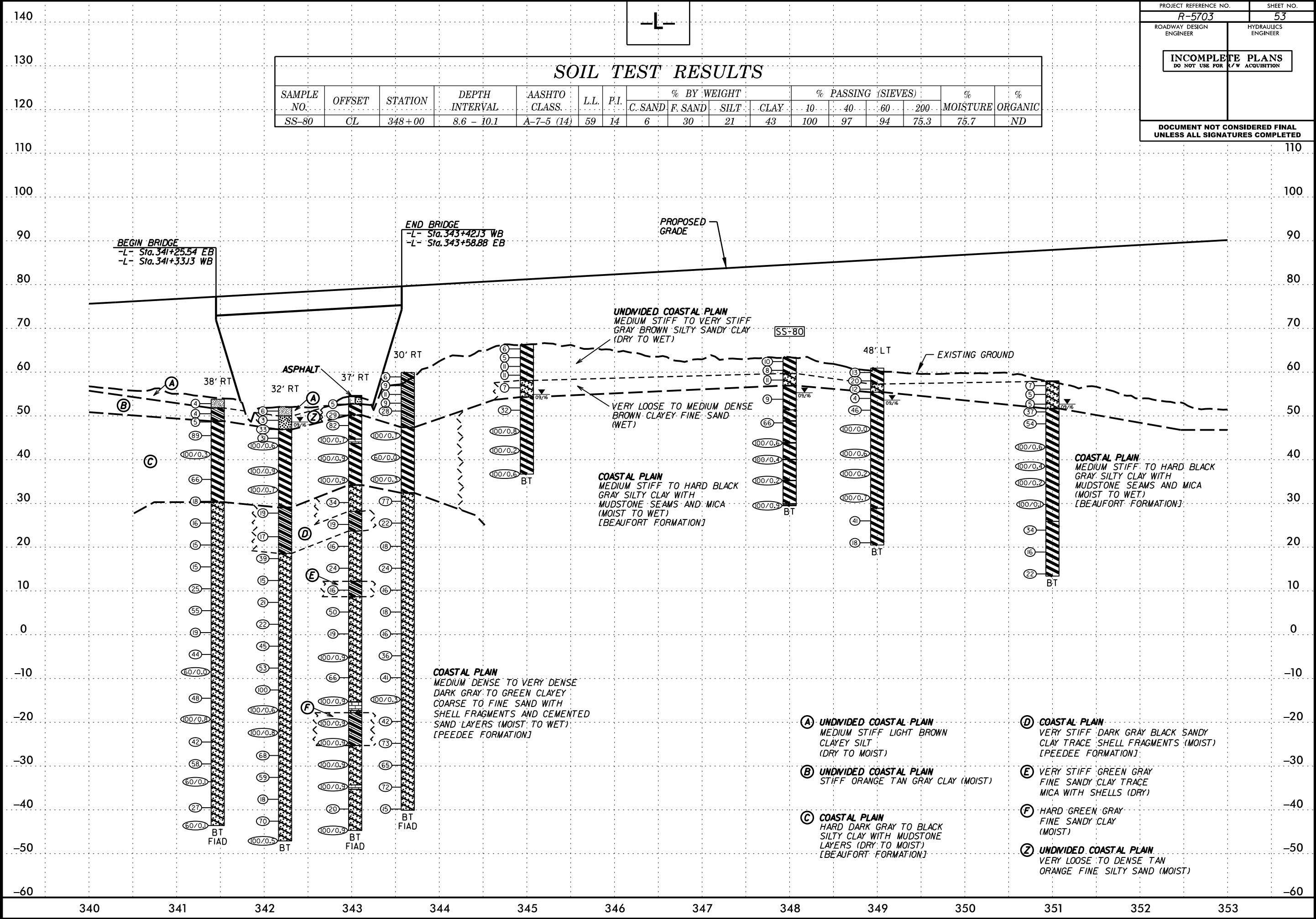
INCOMPLETE PLANS

DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-80	CL	348+00	8.6 - 10.1	A-7-5 (14)	59	14	6	30	21	43	100	97	94	75.3	75.7	ND



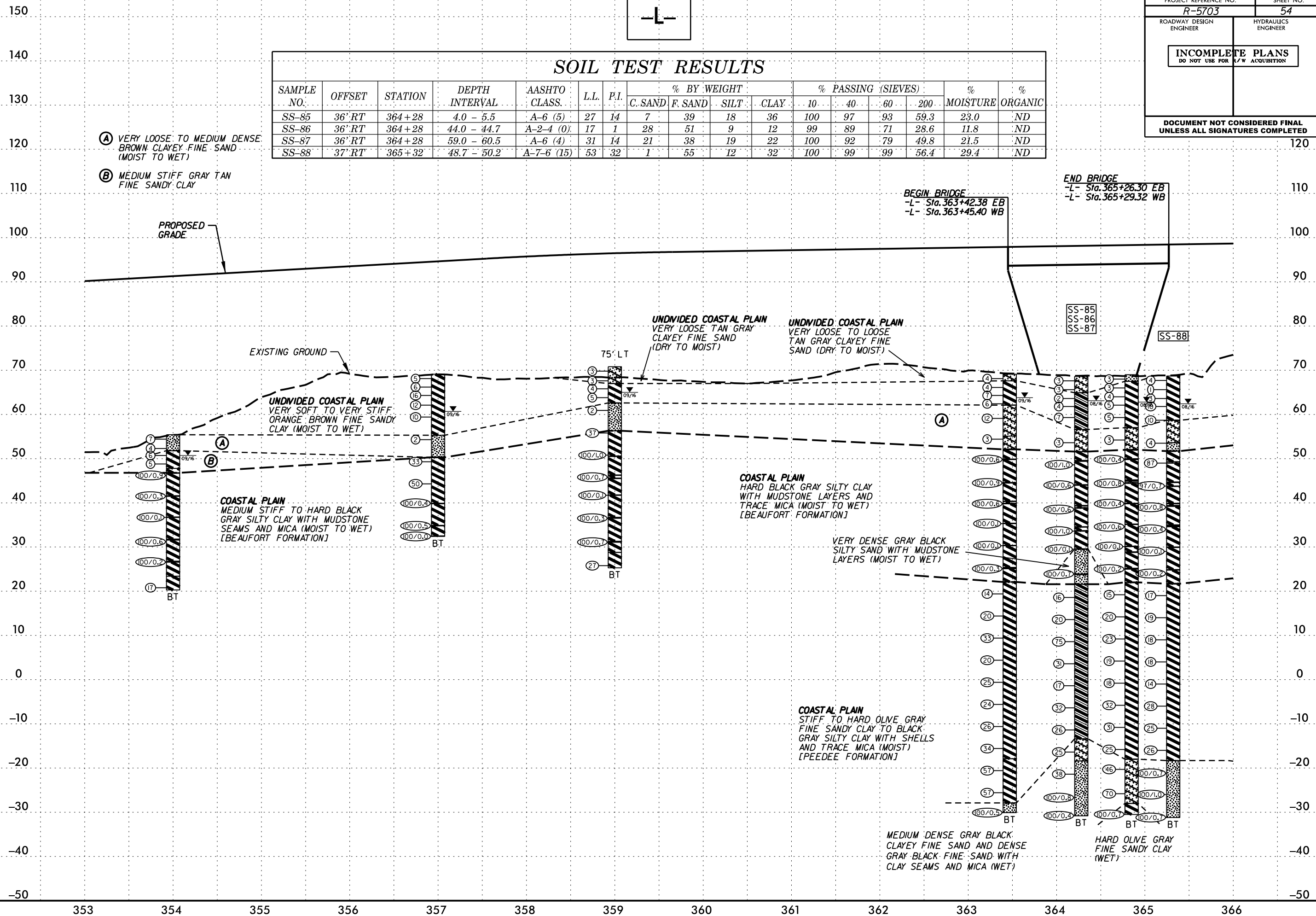


**HYDRAULICS  
ENGINEER**

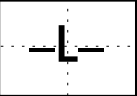
DO NOT USE FOR R/W ACQUISITION

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-85	36' RT	364+28	4.0 - 5.5	A-6 (5)	27	14	7	39	18	36	100	97	93	59.3	23.0	ND
SS-86	36' RT	364+28	44.0 - 44.7	A-2-4 (0)	17	1	28	51	9	12	99	89	71	28.6	11.8	ND
SS-87	36' RT	364+28	59.0 - 60.5	A-6 (4)	31	14	21	38	19	22	100	92	79	49.8	21.5	ND
SS-88	37' RT	365+32	48.7 - 50.2	A-7-6 (15)	53	32	1	55	12	32	100	99	99	56.4	29.4	ND



SYSDGNCN



5/14/99

-Y1-

PROJECT REFERENCE NO.  
R-5703

SHEET NO.  
56

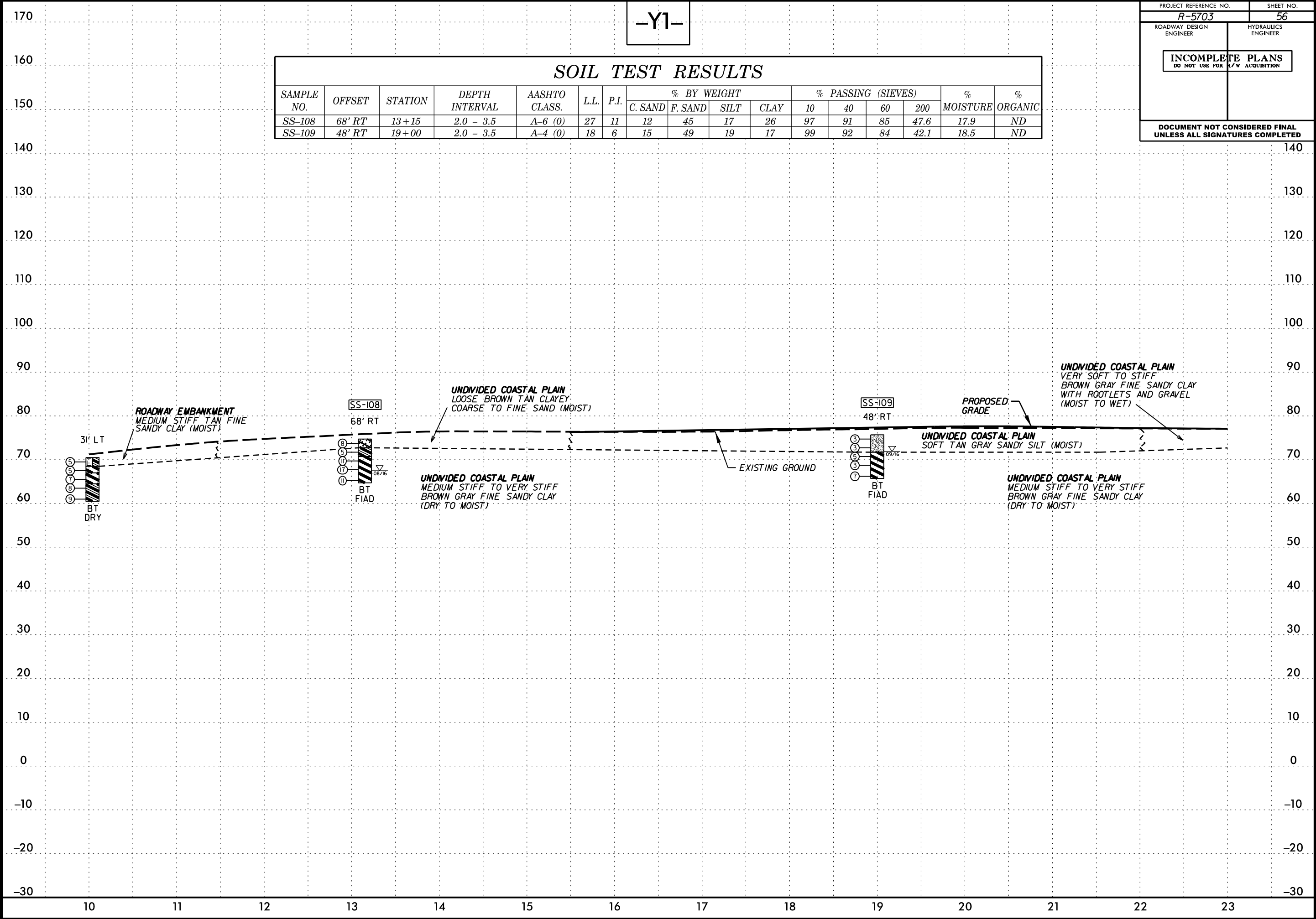
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-108	68' RT	13+15	2.0 - 3.5	A-6 (0)	27	11	12	45	17	26	97	91	85	47.6	17.9	ND
SS-109	48' RT	19+00	2.0 - 3.5	A-4 (0)	18	6	15	49	19	17	99	92	84	42.1	18.5	ND



5/14/99

5/14/99

-Y1-

PROJECT REFERENCE NO.  
R-5703

SHEET NO.  
57

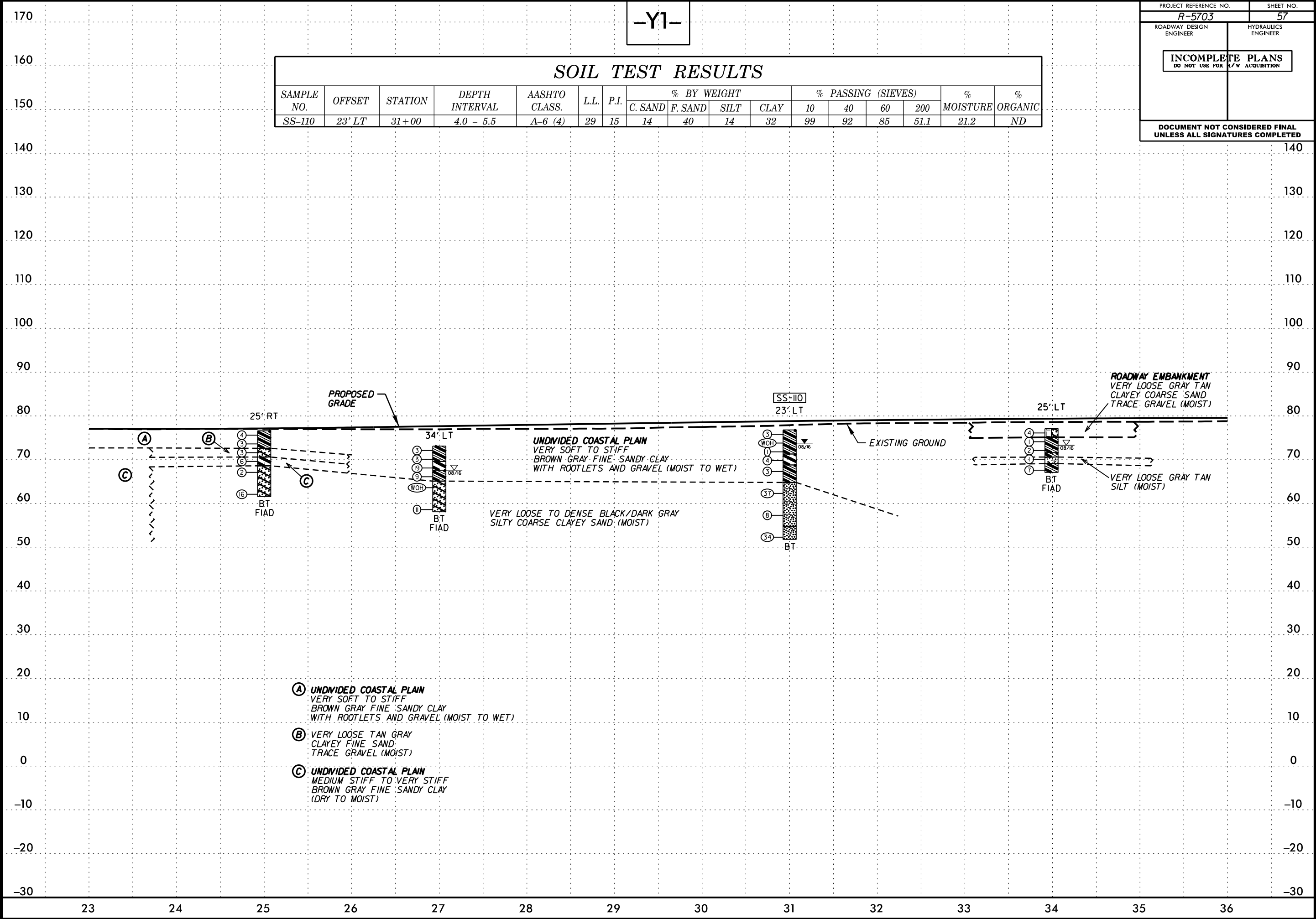
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-110	23' LT	31+00	4.0 - 5.5	A-6 (4)	29	15	14	40	14	32	99	92	85	51.1	21.2	ND

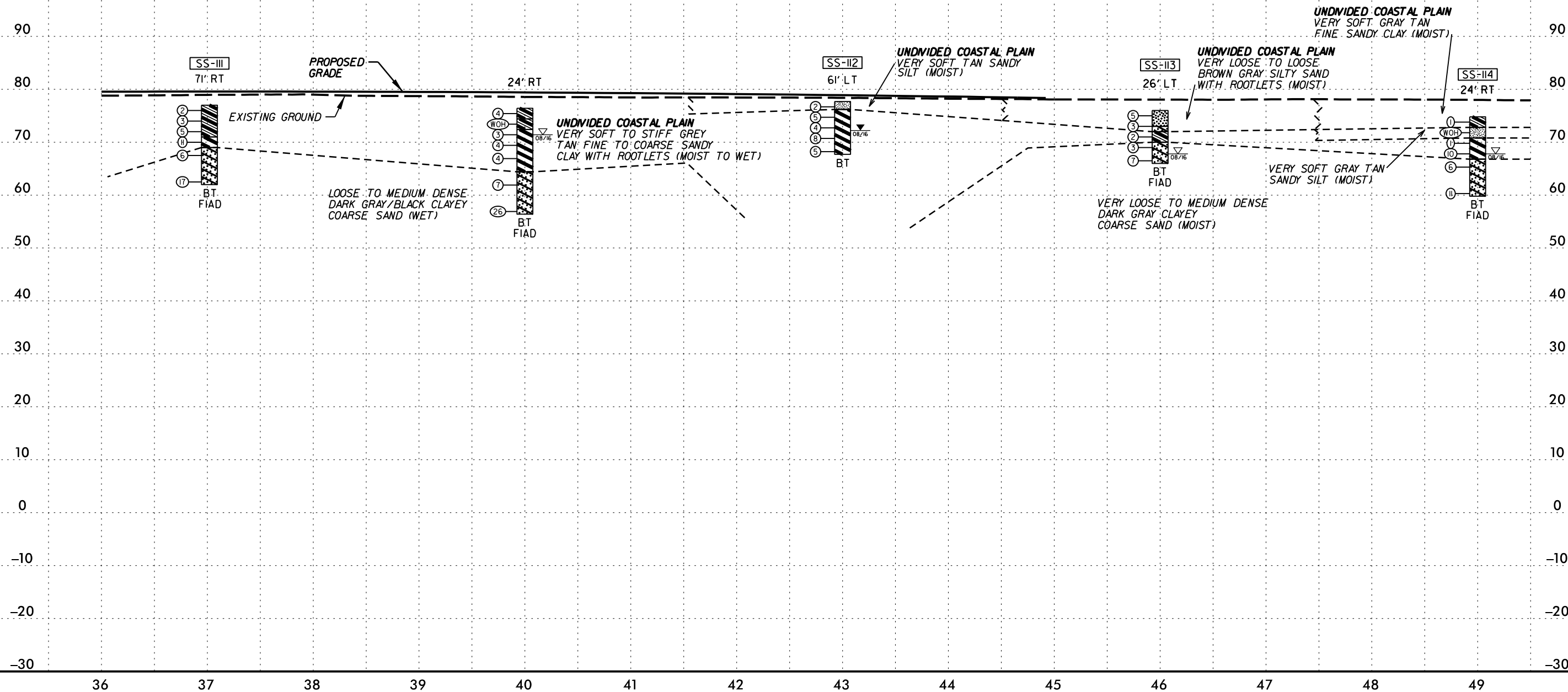


**-Y1-**

PROJECT REFERENCE NO.	SHEET NO.
<i>R-5703</i>	<i>58</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <b>INCOMPLETE PLANS</b>              DO NOT USE FOR R/W ACQUISITION           </div>	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

## SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-111	71' RT	37+02	2.0 - 3.5	A-6 (0)	33	18	17	42	15	26	99	90	82	46.1	18.6	ND
SS-112	61' LT	43+00	0.0 - 1.5	A-4 (0)	20	2	21	43	20	17	97	86	77	40.8	16.2	ND
SS-113	26' LT	46+00	4.0 - 5.5	A-6 (1)	25	11	22	40	14	24	97	87	76	40.8	22.5	ND
SS-114	24' RT	49+00	2.0 - 3.5	A-4 (0)	24	9	24	41	15	20	96	83	73	38.4	28.6	ND



5/14/99

-Y1RPA-

PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**59**

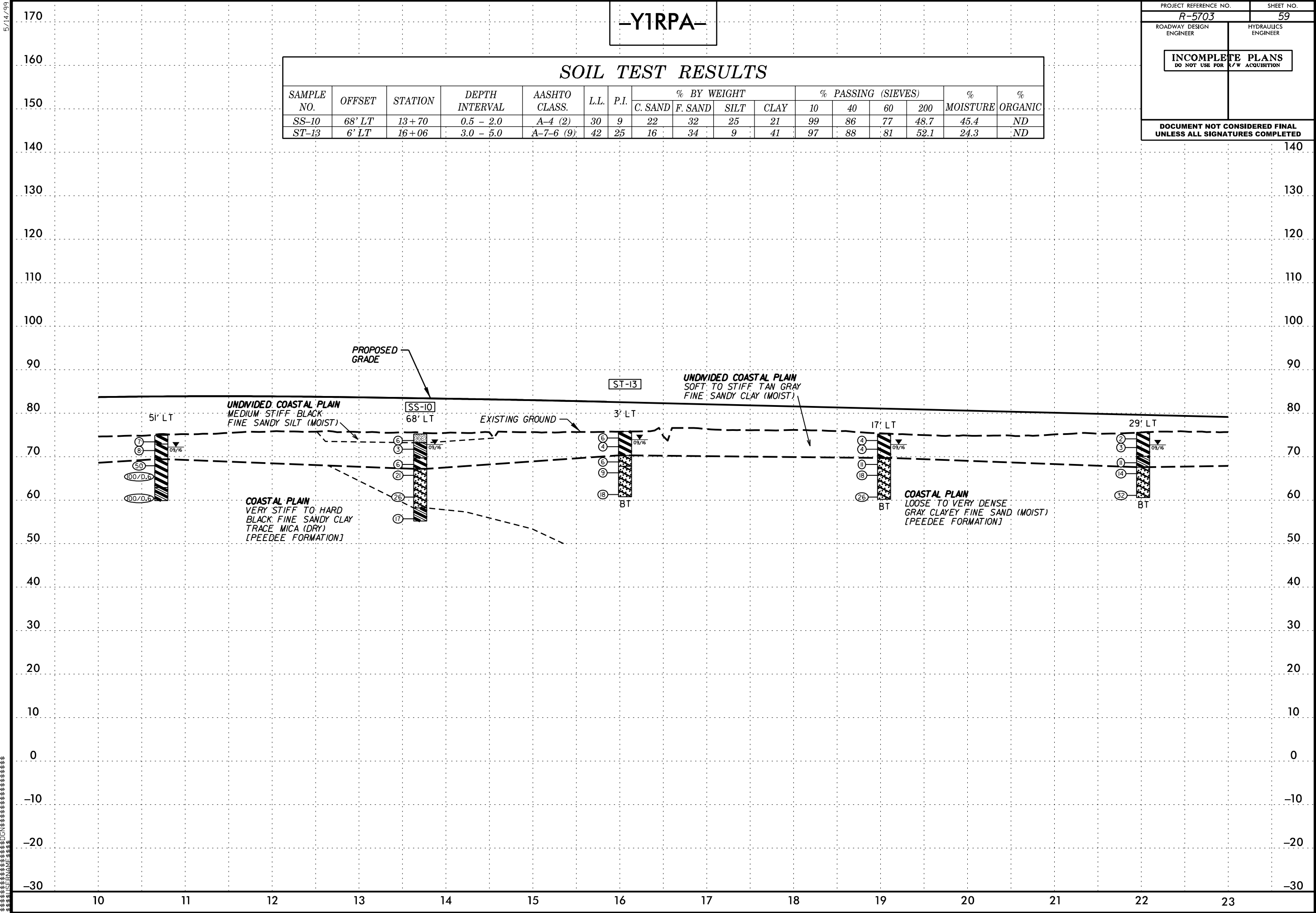
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-10	68' LT	13+70	0.5 - 2.0	A-4 (2)	30	9	22	32	25	21	99	86	77	48.7	45.4	ND
ST-13	6' LT	16+06	3.0 - 5.0	A-7-6 (9)	42	25	16	34	9	41	97	88	81	52.1	24.3	ND

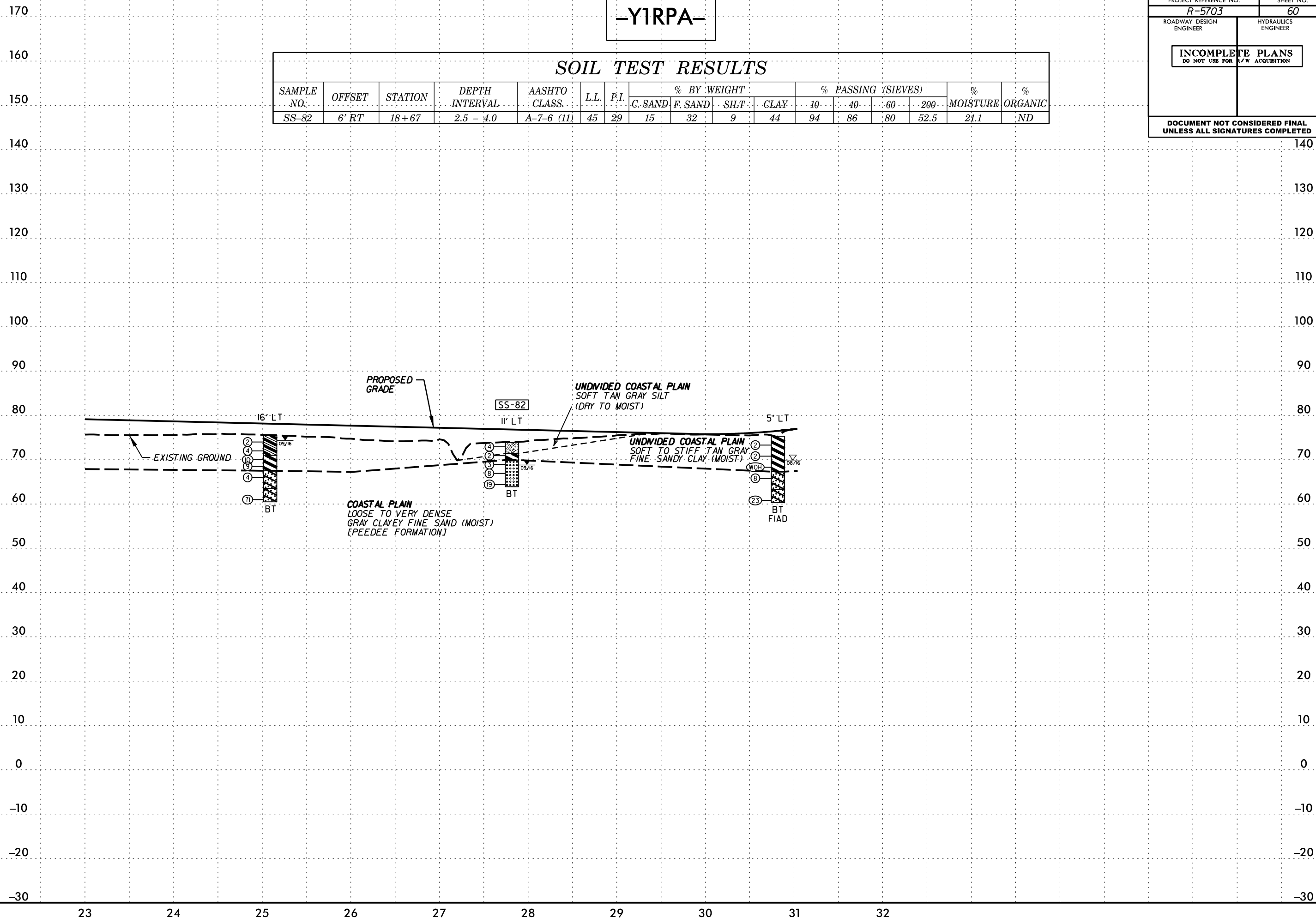


**—Y1RPA—**

## SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-82	6' RT	18+67	2.5 - 4.0	A-7-6 (U)	45	29	15	32	9	44	94	86	80	52.5	21.1	ND

PROJECT REFERENCE NO.	SHEET NO.
R-5703	60
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <b>INCOMPLETE PLANS</b>              DO NOT USE FOR A/W ACQUISITION         </div>	
<p style="text-align: center;"><b>DO NOT BE CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>	



5/14/99

-Y1LPA-

PROJECT REFERENCE NO.  
R-5703

SHEET NO.  
61

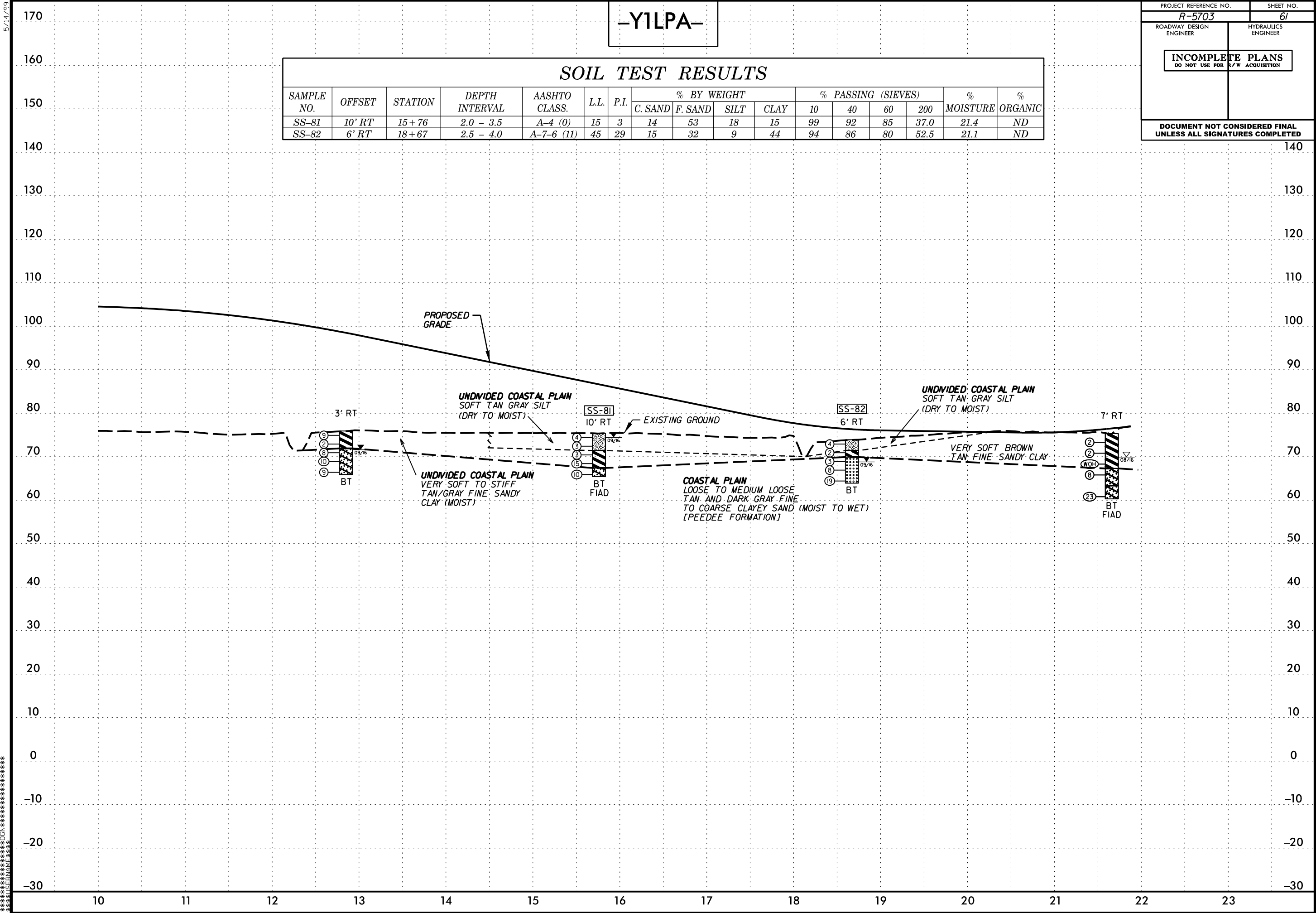
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-81	10' RT	15+76	2.0 - 3.5	A-4 (0)	15	3	14	53	18	15	99	92	85	37.0	21.4	ND
SS-82	6' RT	18+67	2.5 - 4.0	A-7-6 (11)	45	29	15	32	9	44	94	86	80	52.5	21.1	ND



5/14/99  
Y1LPA  
SS-81  
SS-82  
BT  
BT FIAD  
BT  
BT FIAD

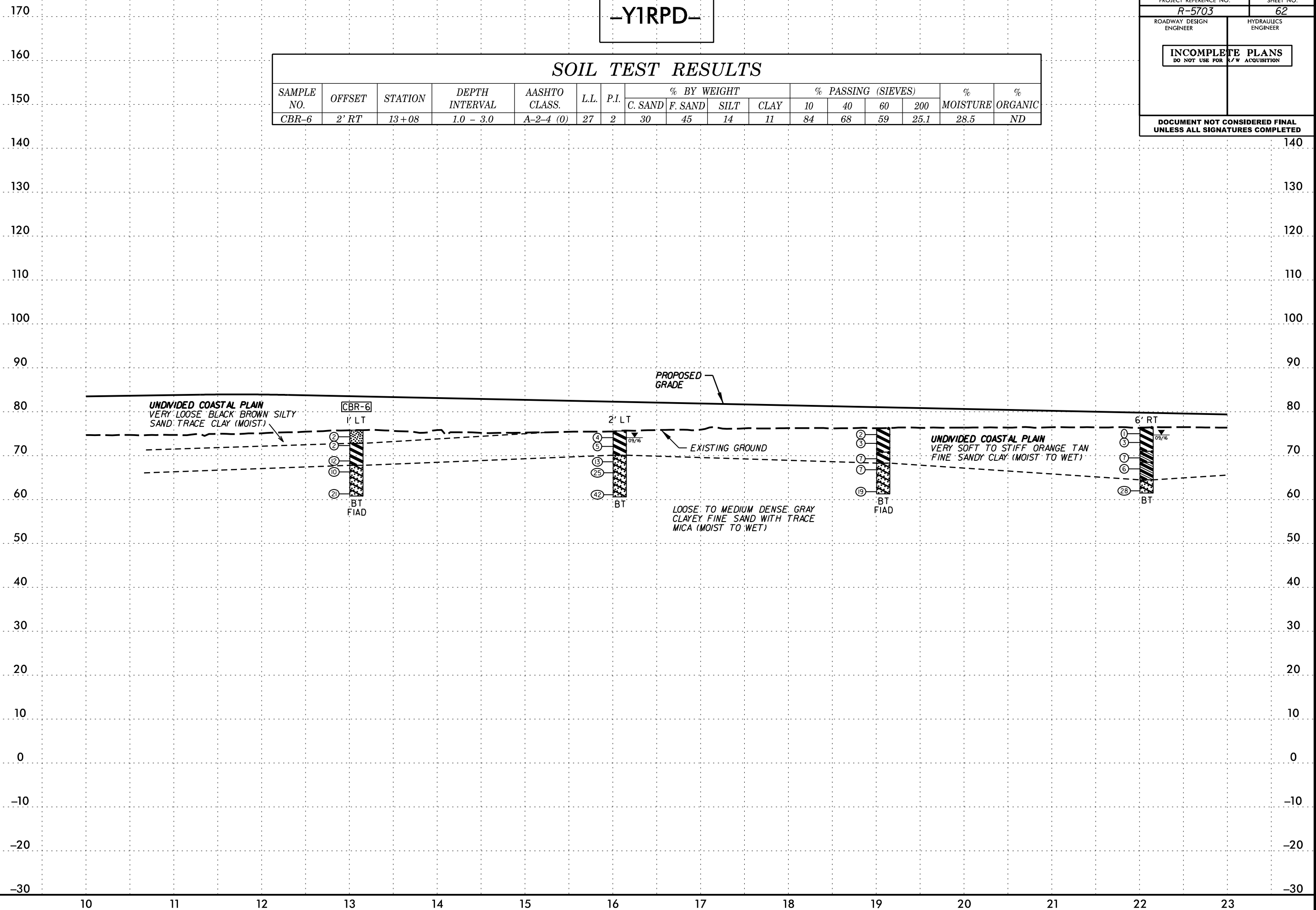


**—Y1RPD—**

## SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
CBR-6	2' RT	13+08	1.0 - 3.0	A-2-4 (0)	27	2	30	45	14	11	84	68	59	25.1	28.5	ND

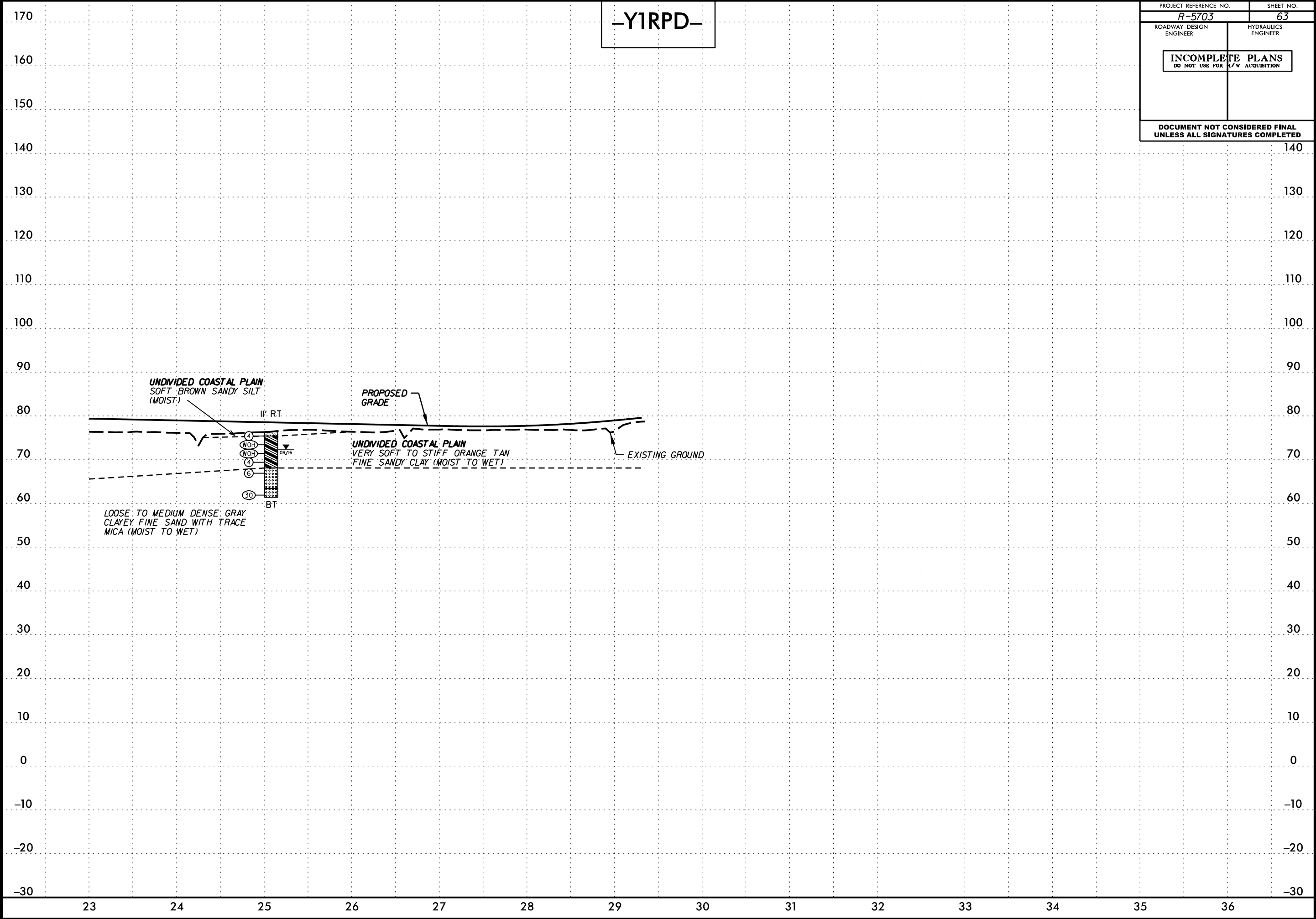
PROJECT REFERENCE NO.	SHEET NO.
<i>R-5703</i>	<i>62</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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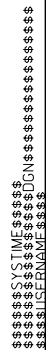
-Y1RPD-

PROJECT REFERENCE NO.		SHEET NO.	
R-5703		63	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div>INCOMPLETE PLANS</div> <div>DO NOT USE FOR R/W ACQUISITION</div>			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



TIME  
DESIGN  
DRAWING

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-83	16' RT	15+96	2.5 - 4.0	A-7-6 (18)	54	34	13	28	9	49	99	92	86	61.5	30.3	ND



5/14/99

-Y8-

PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**65**

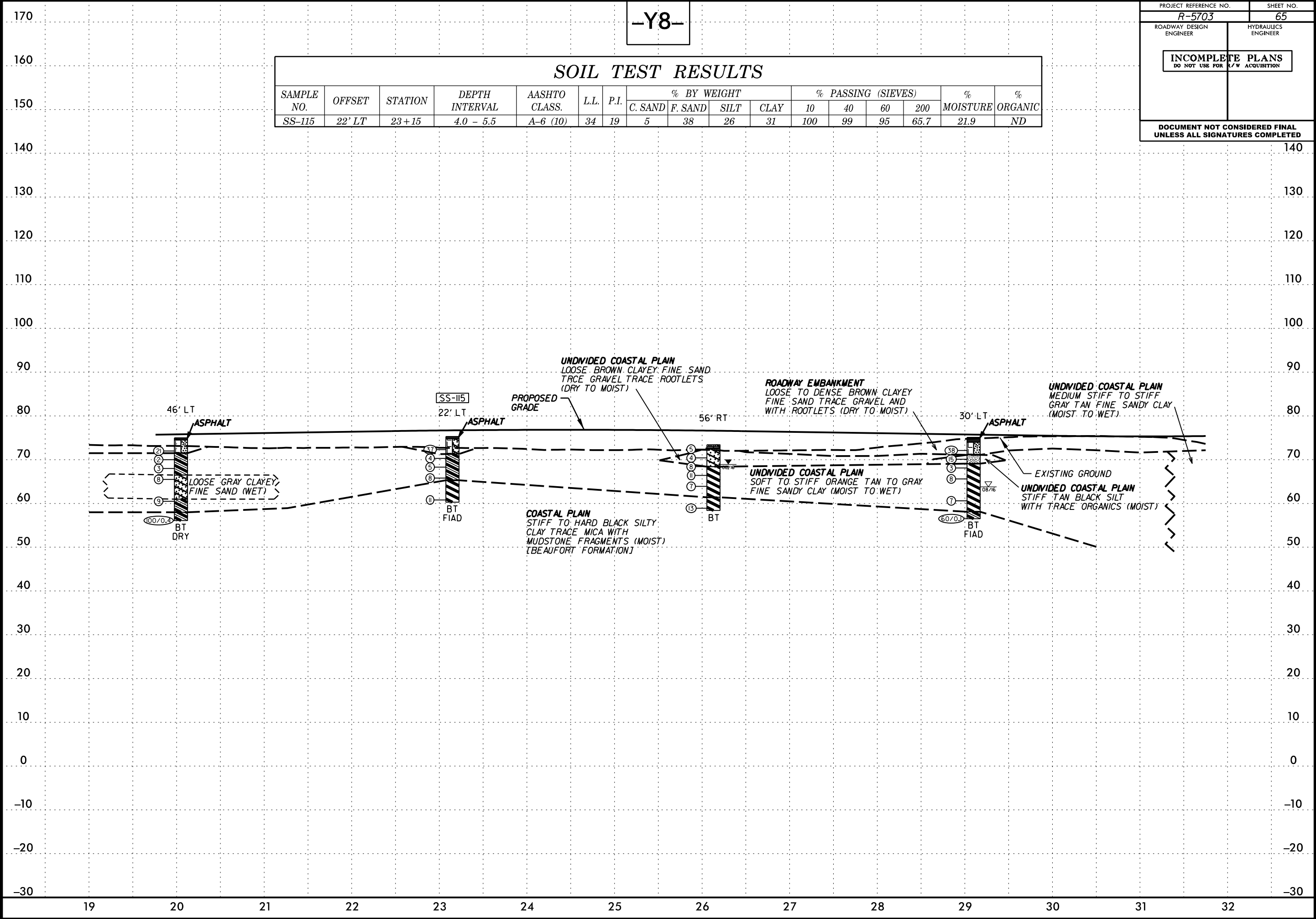
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

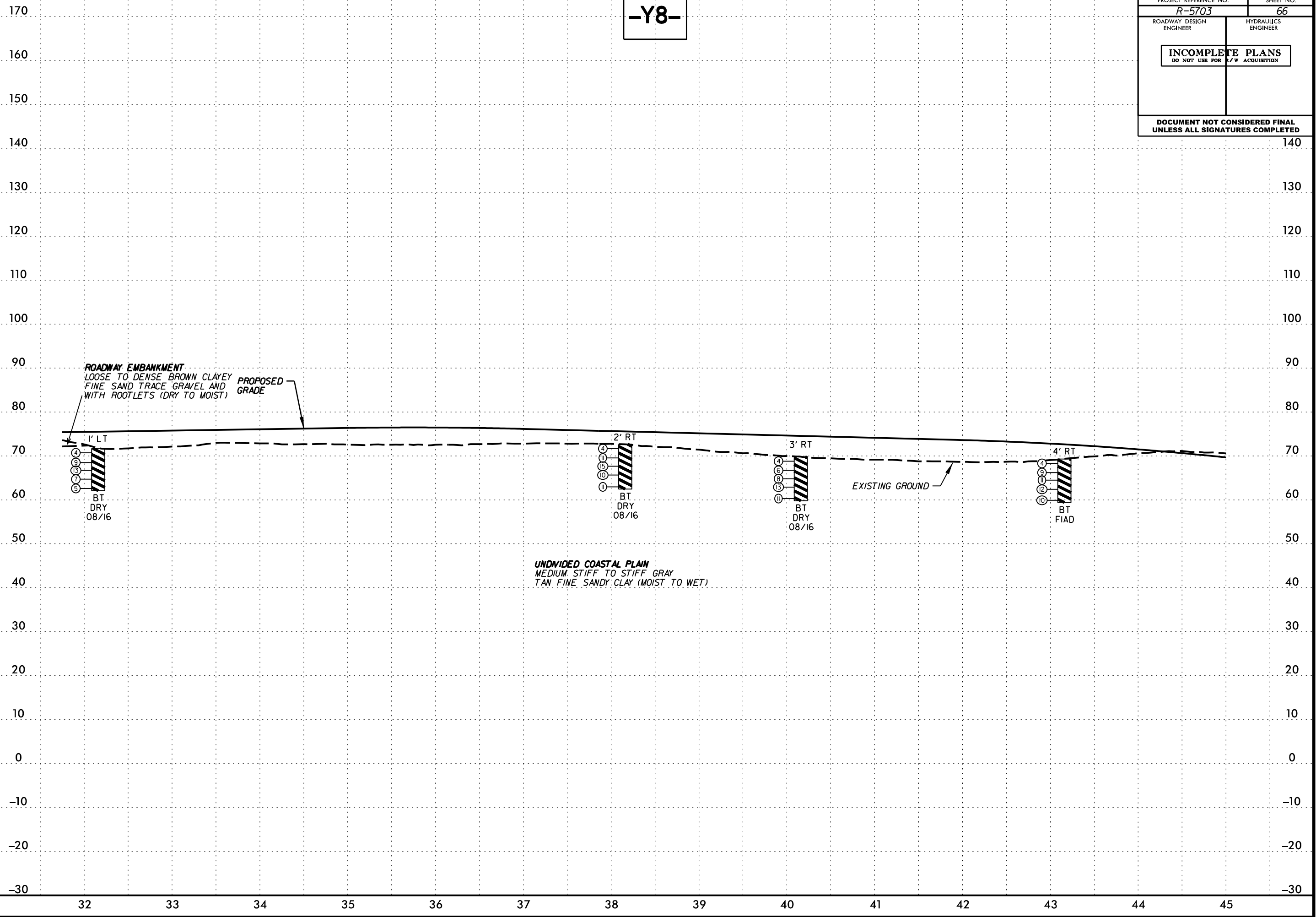
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-115	22' LT	23+15	4.0 - 5.5	A-6 (10)	34	19	5	38	26	31	100	99	95	65.7	21.9	ND



SYSDGNCN

PROJECT REFERENCE NO.		SHEET NO.	
R-5703		66	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
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<p style="text-align: center;"><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>			



5/14/99

-Y8-

PROJECT REFERENCE NO.  
R-5703

SHEET NO.  
67

ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

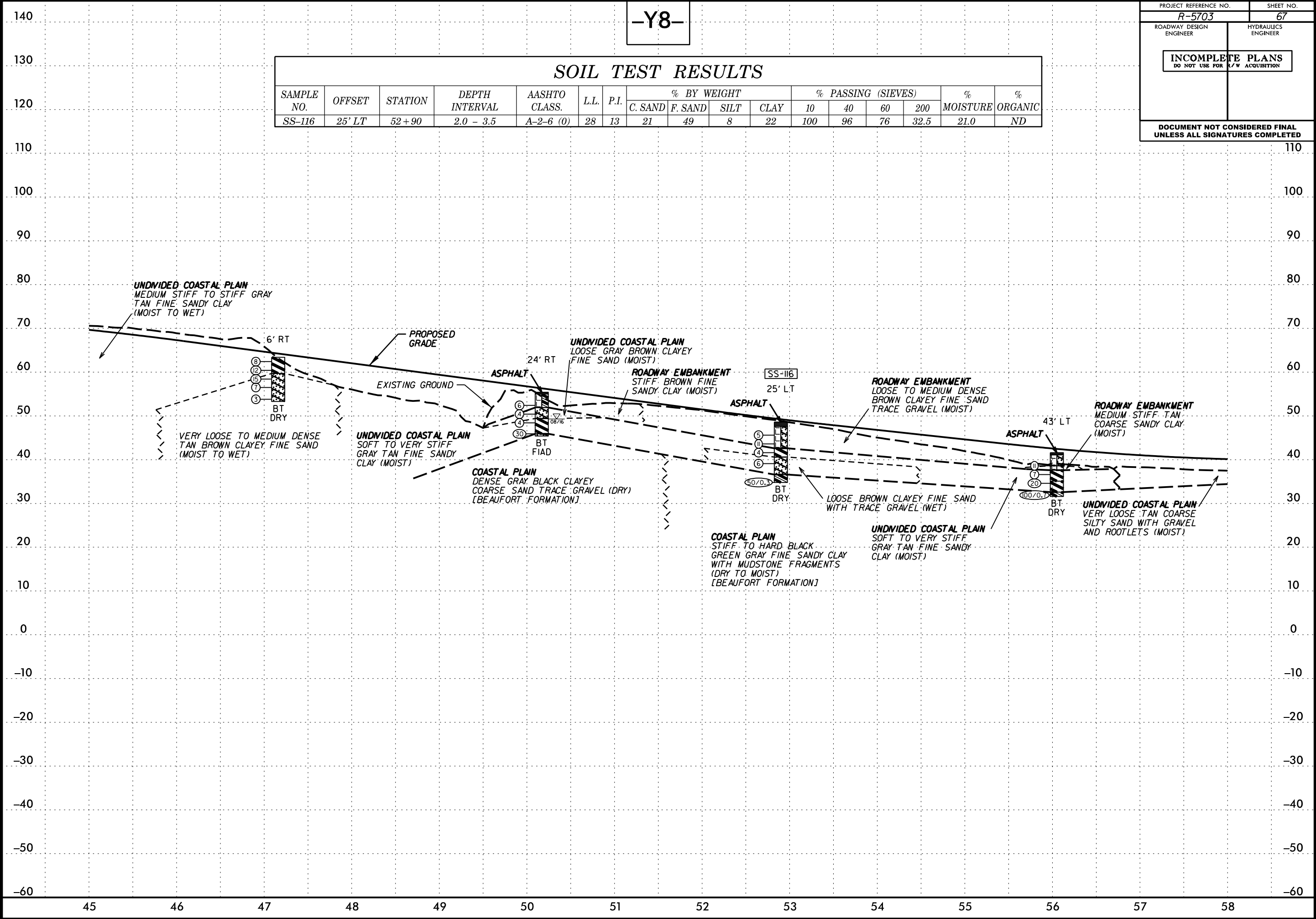
INCOMPLETE PLANS

DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-116	25' LT	52+90	2.0 - 3.5	A-2-6 (0)	28	13	21	49	8	22	100	96	76	32.5	21.0	ND



\$\$\$\$\$TIME\$\$\$\$\$  
\$\$\$\$\$DATE\$\$\$\$\$  
\$\$\$\$\$DRAWN\$\$\$\$\$  
\$\$\$\$\$CHECKED\$\$\$\$\$  
\$\$\$\$\$APPROVED\$\$\$\$\$

5/14/99

TIME\$DGN\$

-Y8-

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-117	75' RT	59+15	2.0 - 3.5	A-6 (7)	30	17	10	36	21	33	99	95	89	59.7	22.0	ND

PROJECT REFERENCE NO.  
R-5703

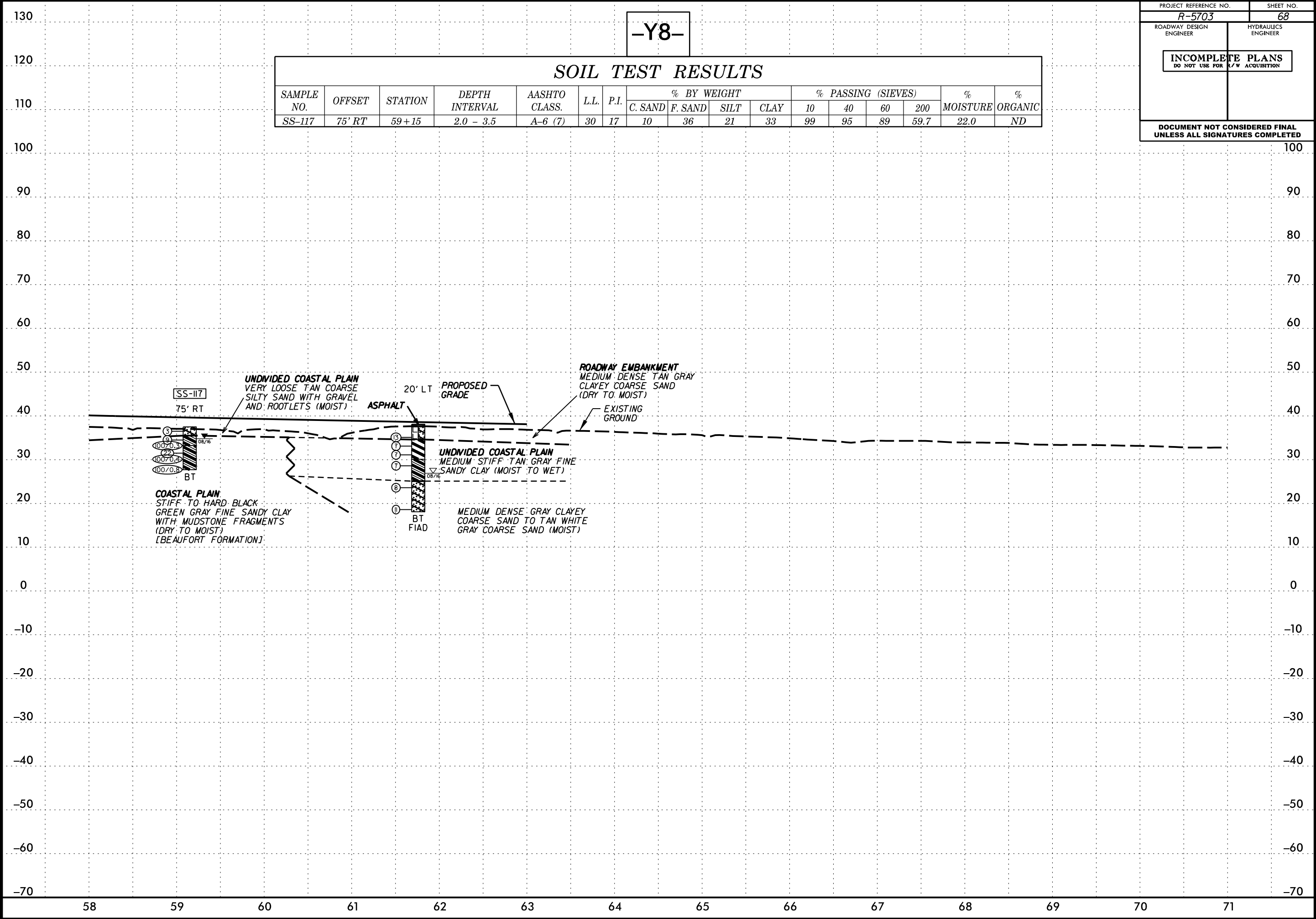
SHEET NO.  
68

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

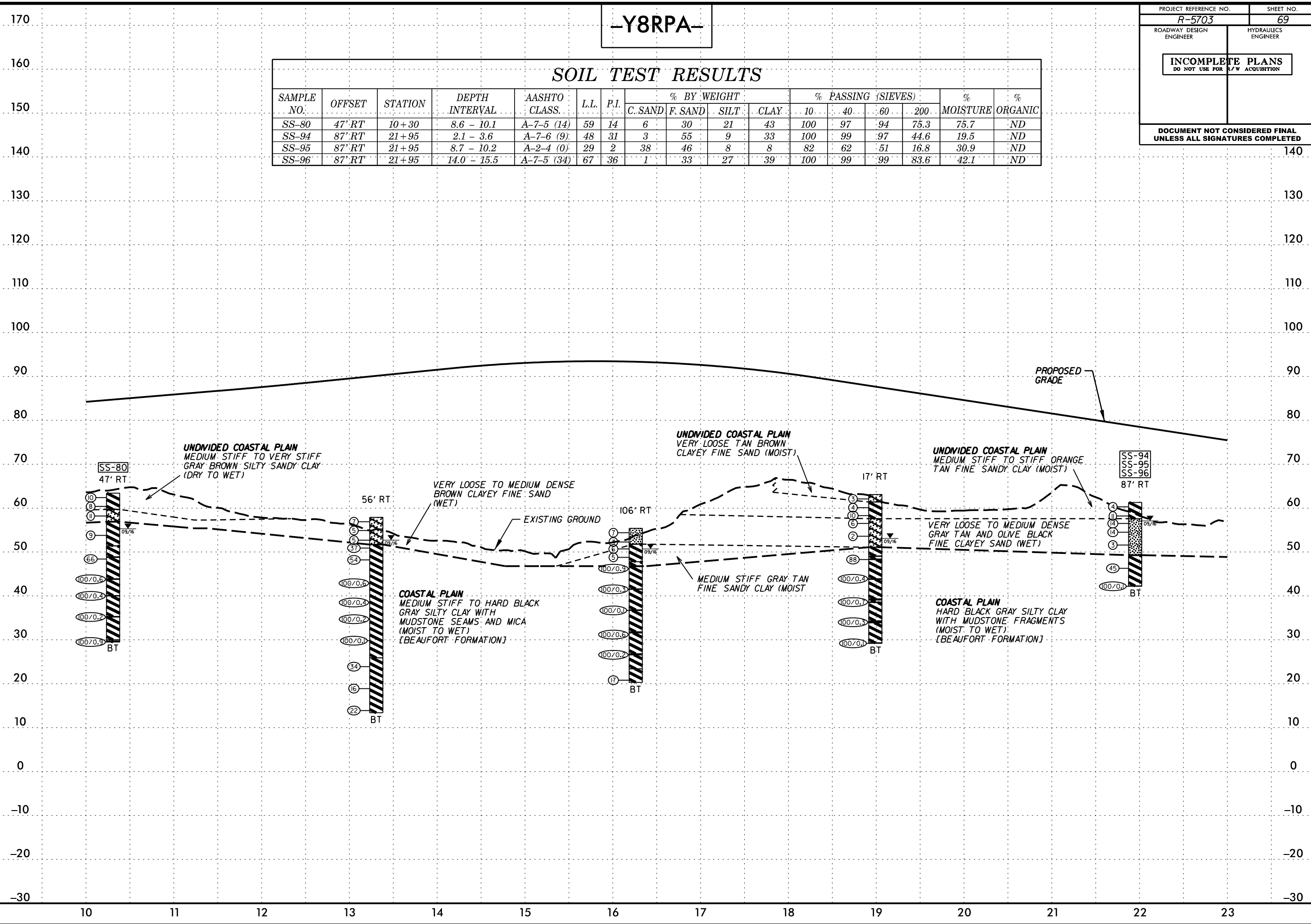


—Y8RPA—

## SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-80	47' RT	10+30	8.6 - 10.1	A-7-5 (14)	59	14	6	30	21	43	100	97	94	75.3	75.7	ND
SS-94	87' RT	21+95	2.1 - 3.6	A-7-6 (9)	48	31	3	55	9	33	100	99	97	44.6	19.5	ND
SS-95	87' RT	21+95	8.7 - 10.2	A-2-4 (0)	29	2	38	46	8	8	82	62	51	16.8	30.9	ND
SS-96	87' RT	21+95	14.0 - 15.5	A-7-5 (34)	67	36	1	33	27	39	100	99	99	83.6	42.1	ND

PROJECT REFERENCE NO.	SHEET NO.
<i>R-5703</i>	<i>69</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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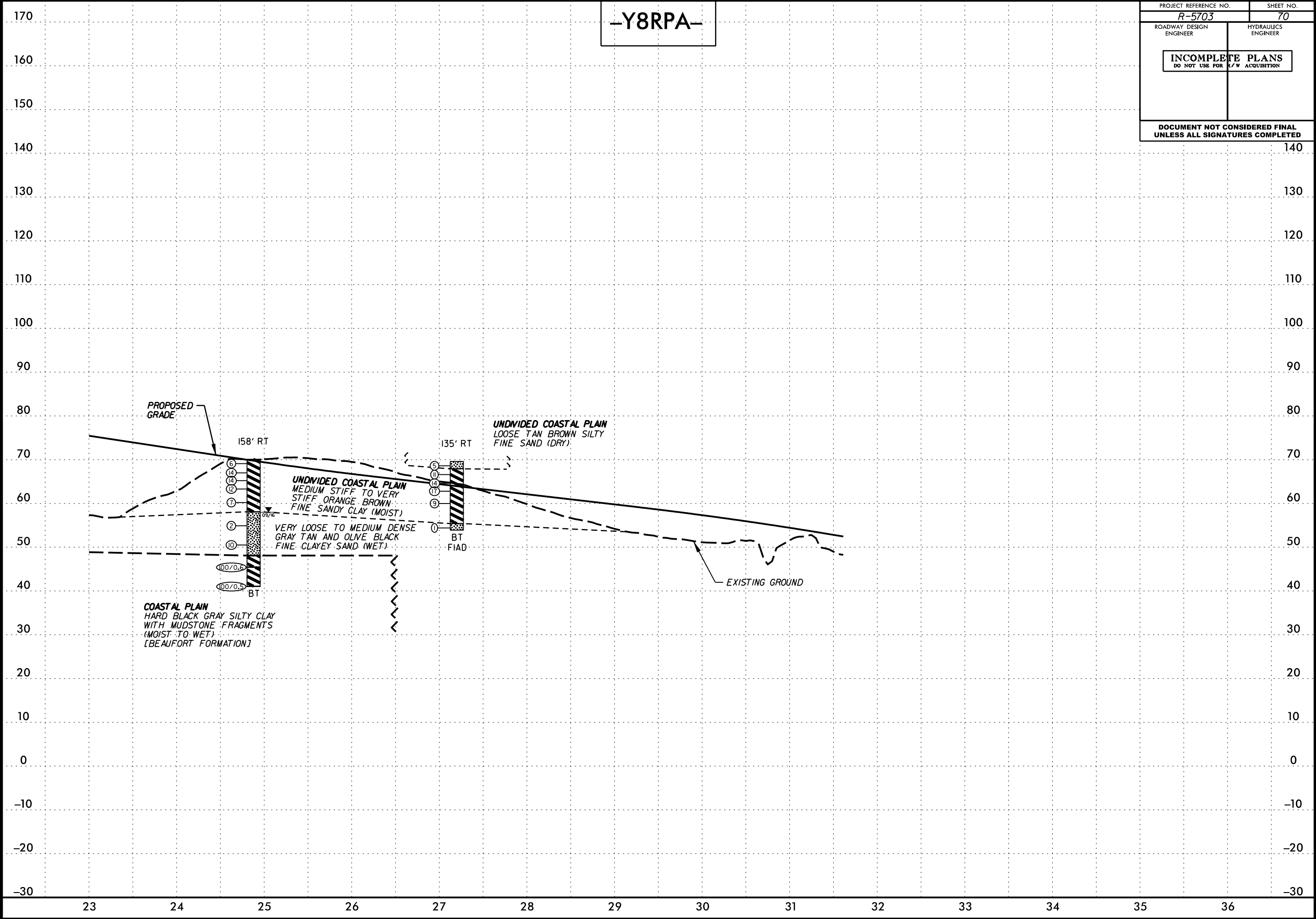




5/14/99

-Y8RPA-

PROJECT REFERENCE NO.		SHEET NO.	
R-5703		70	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div>INCOMPLETE PLANS</div> <div>DO NOT USE FOR R/W ACQUISITION</div>			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



5/14/99

-Y8RPB-

PROJECT REFERENCE NO.  
R-5703

SHEET NO.  
71

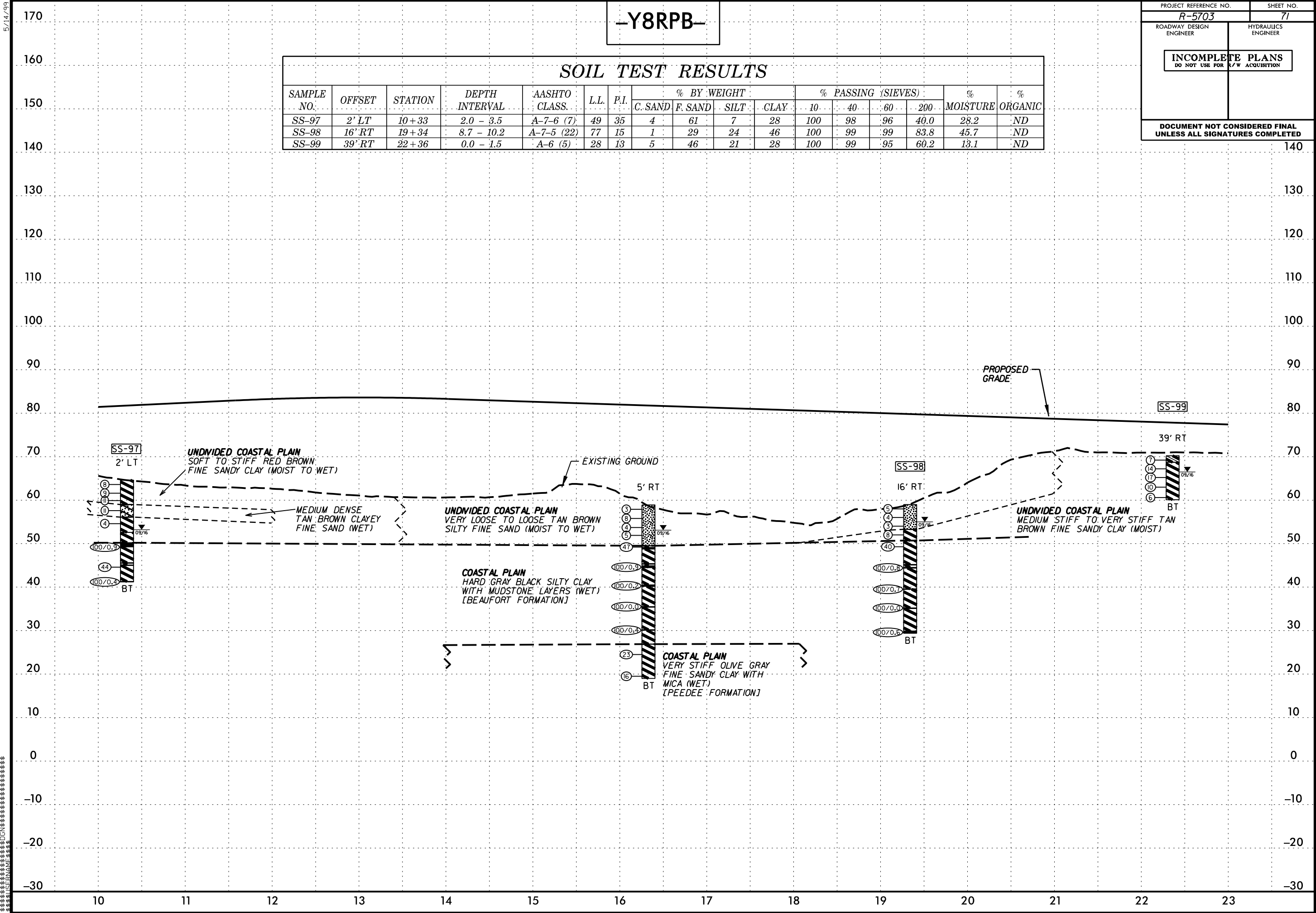
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-97	2' LT	10+33	2.0 - 3.5	A-7-6 (7)	49	35	4	61	7	28	100	98	96	40.0	28.2	ND
SS-98	16' RT	19+34	8.7 - 10.2	A-7-5 (22)	77	15	1	29	24	46	100	99	99	83.8	45.7	ND
SS-99	39' RT	22+36	0.0 - 1.5	A-6 (5)	28	13	5	46	21	28	100	99	95	60.2	13.1	ND



5/14/99

-Y8RPB-

PROJECT REFERENCE NO.  
R-5703

SHEET NO.  
72

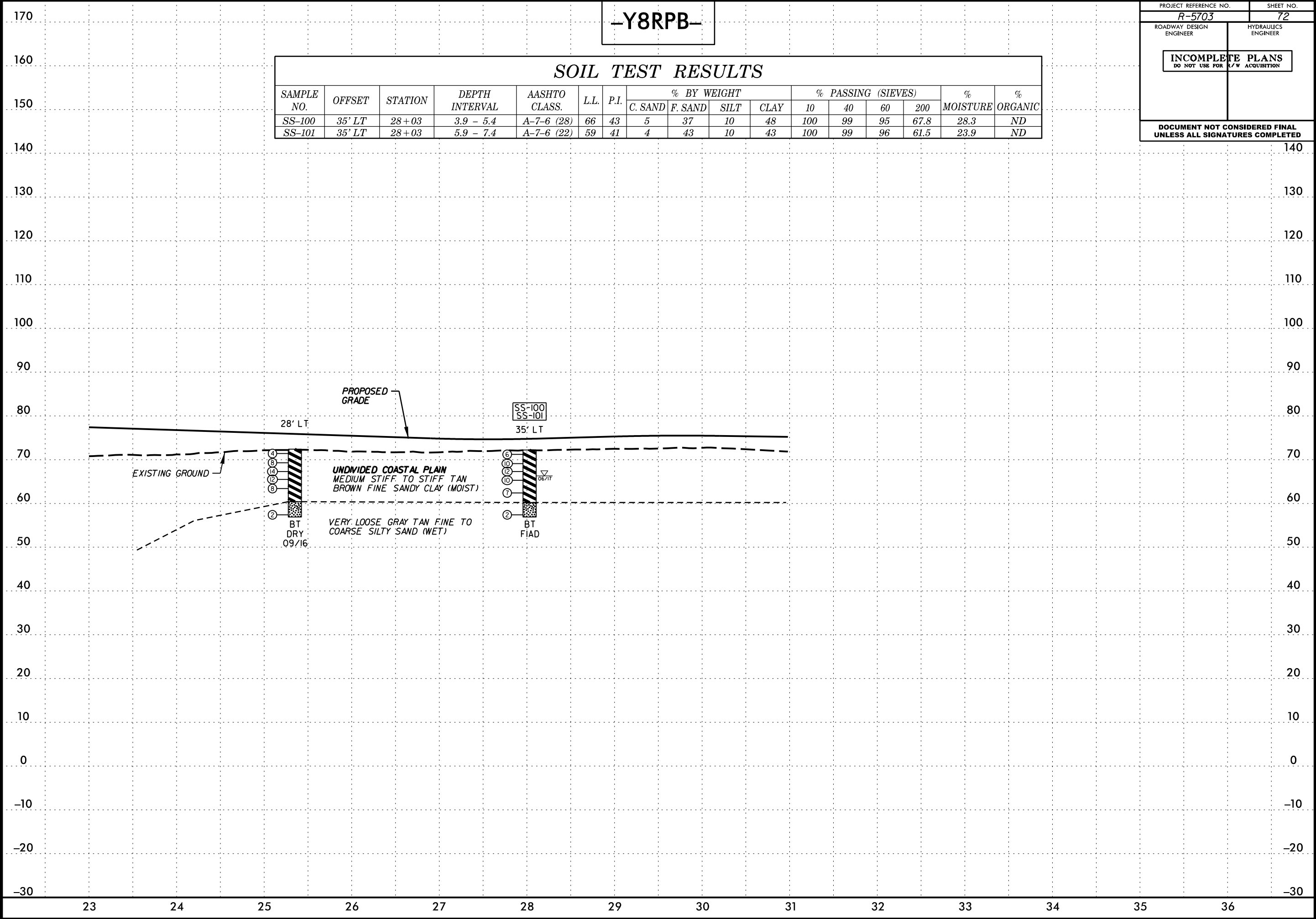
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-100	35' LT	28+03	3.9 - 5.4	A-7-6 (28)	66	43	5	37	10	48	100	99	95	67.8	28.3	ND
SS-101	35' LT	28+03	5.9 - 7.4	A-7-6 (22)	59	41	4	43	10	43	100	99	96	61.5	23.9	ND



5/14/99

-Y8LPC-

PROJECT REFERENCE NO.  
R-5703

SHEET NO.  
73

ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

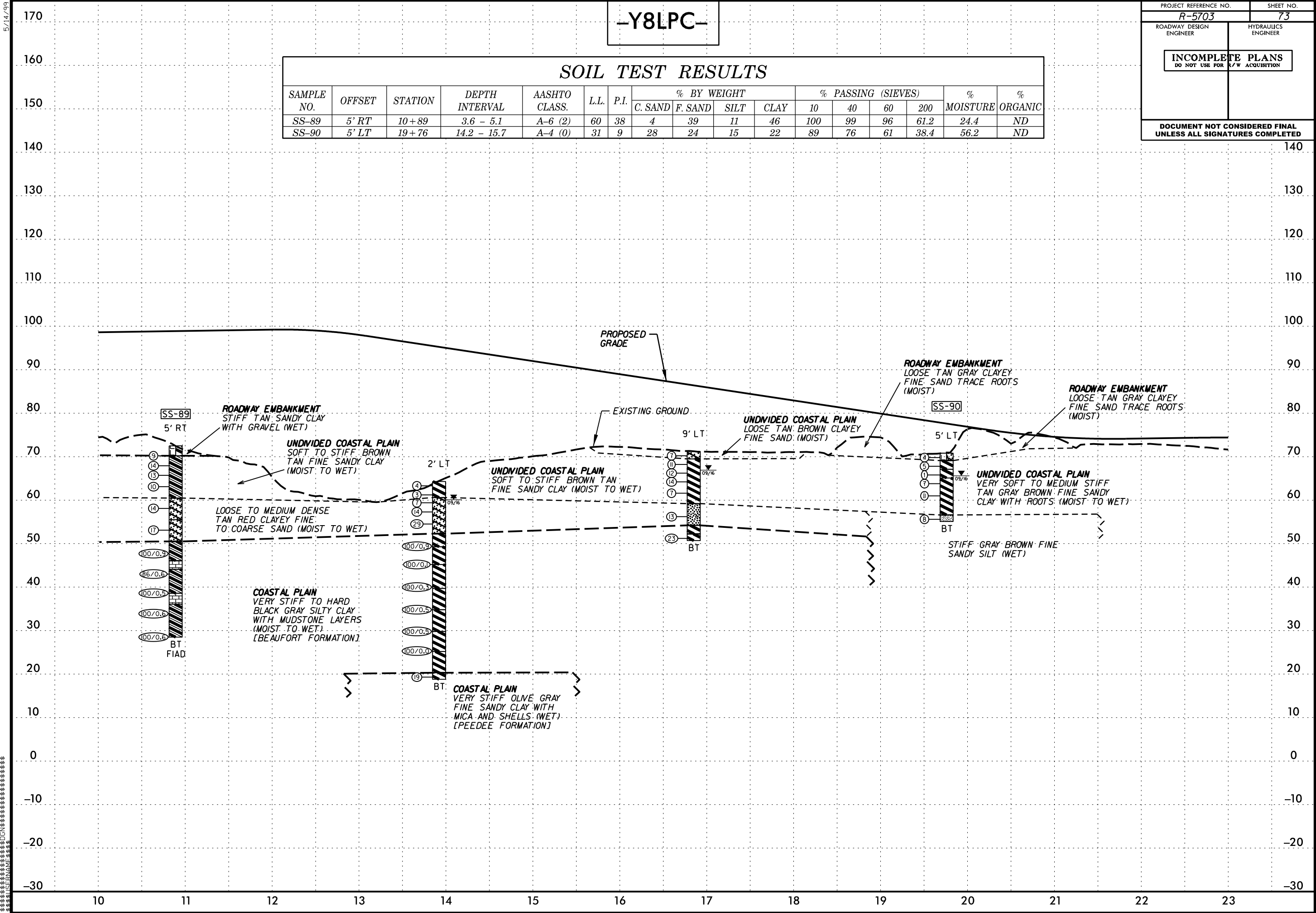
INCOMPLETE PLANS

DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

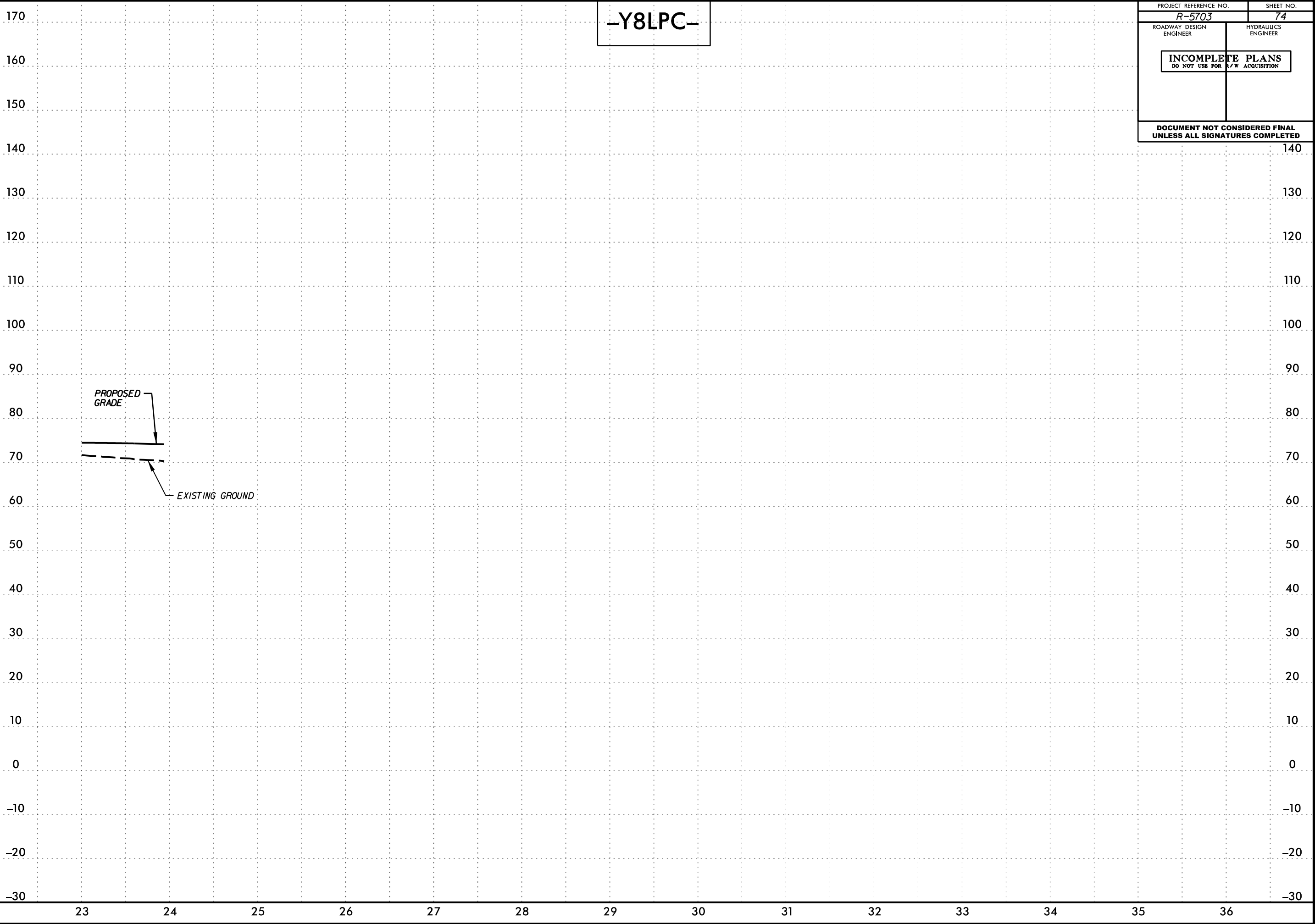
SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-89	5' RT	10+89	3.6 - 5.1	A-6 (2)	60	38	4	39	11	46	100	99	96	61.2	24.4	ND
SS-90	5' LT	19+76	14.2 - 15.7	A-4 (0)	31	9	28	24	15	22	89	76	61	38.4	56.2	ND



5/14/99

—Y8LPC—

PROJECT REFERENCE NO.		SHEET NO.	
R-5703		74	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div>INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION</div>			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



5/14/99

-Y8LPD-

PROJECT REFERENCE NO.  
R-5703

SHEET NO.  
75

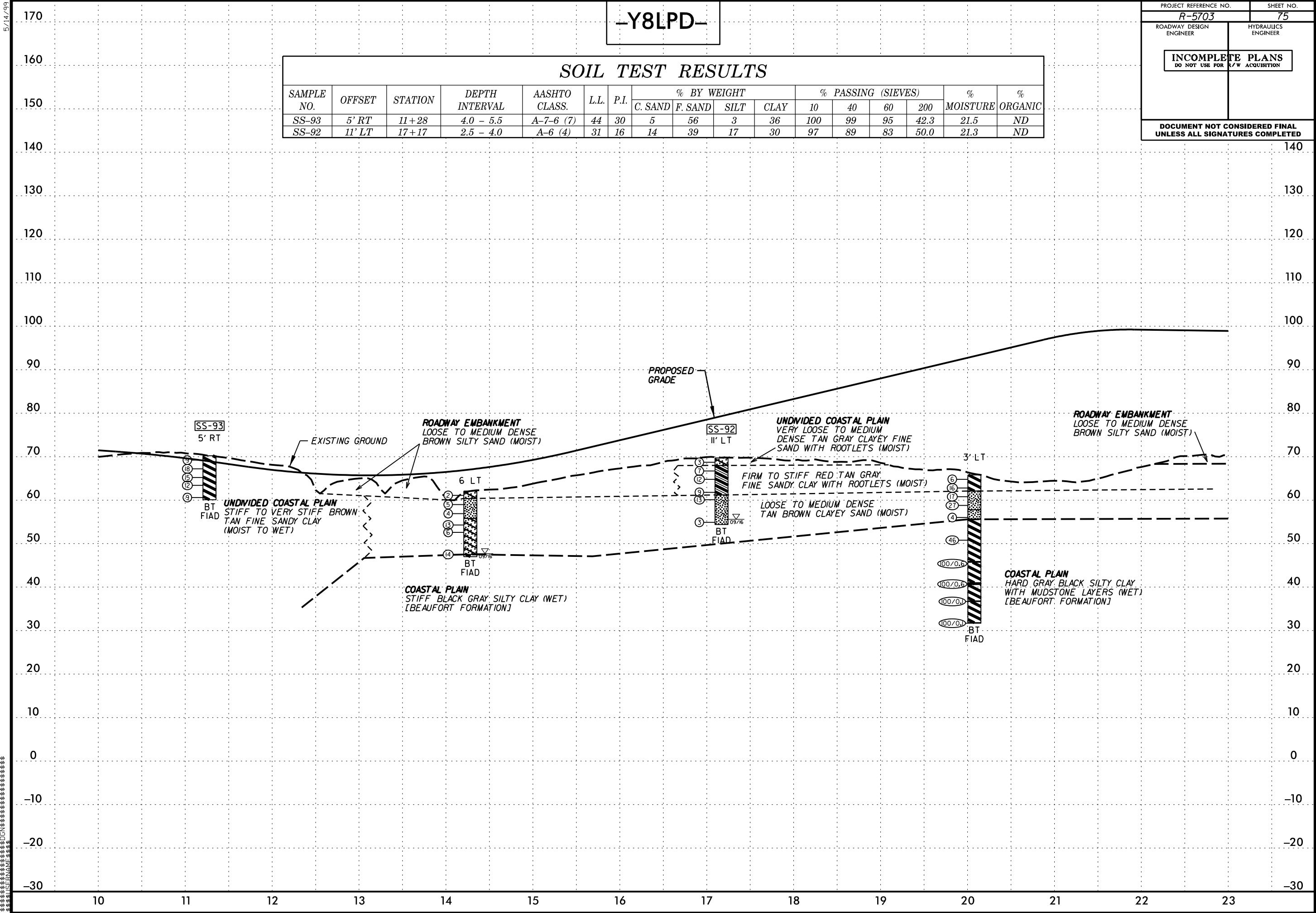
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

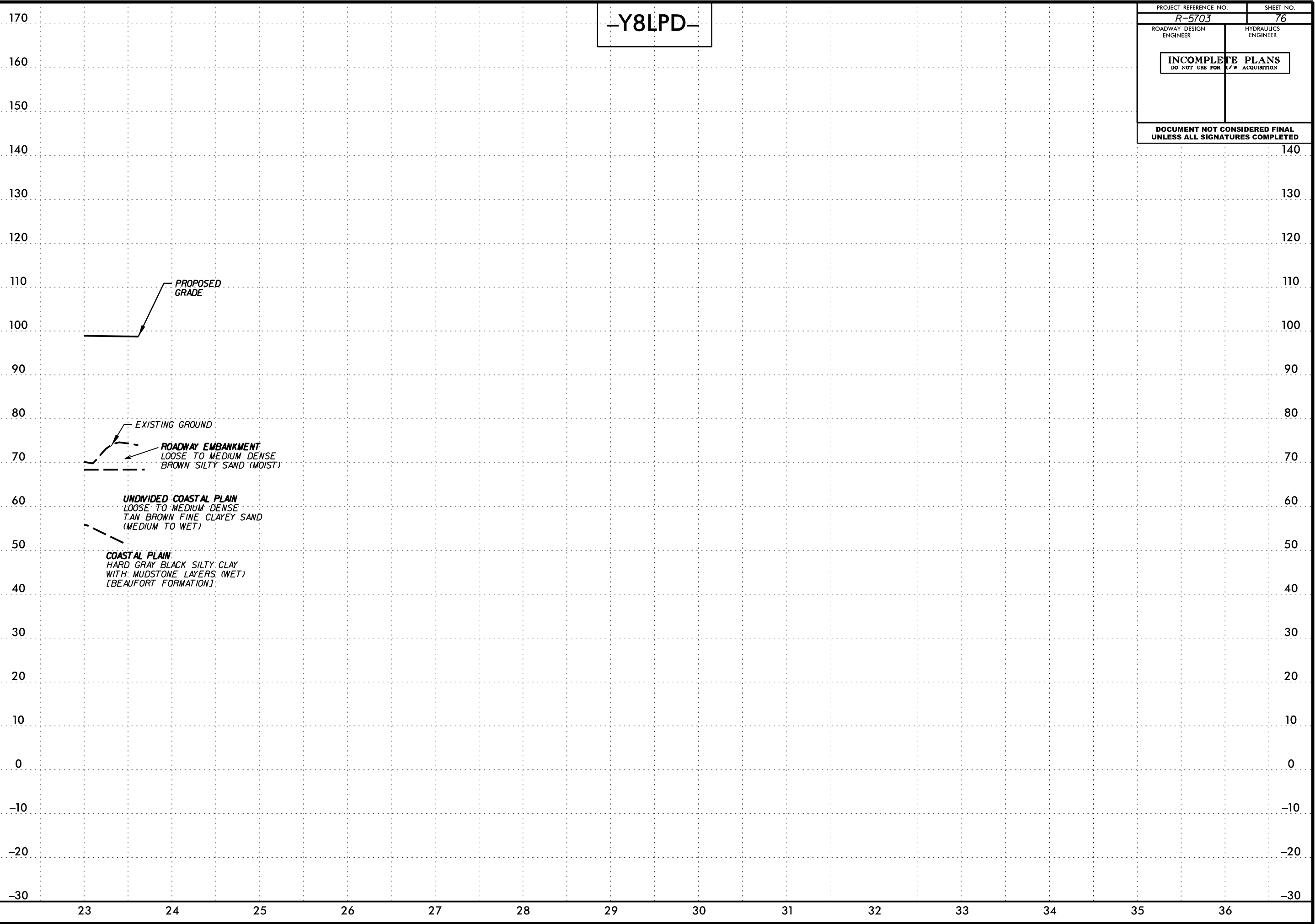
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-93	5' RT	11+28	4.0 - 5.5	A-7-6 (7)	44	30	5	56	3	36	100	99	95	42.3	21.5	ND
SS-92	11' LT	17+17	2.5 - 4.0	A-6 (4)	31	16	14	39	17	30	97	89	83	50.0	21.3	ND



SYNOPSIS OF THE PROCEEDINGS OF THE 100TH ANNUAL MEETING OF THE AMERICAN SOCIETY OF CLIMATE ENGINEERS, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674,

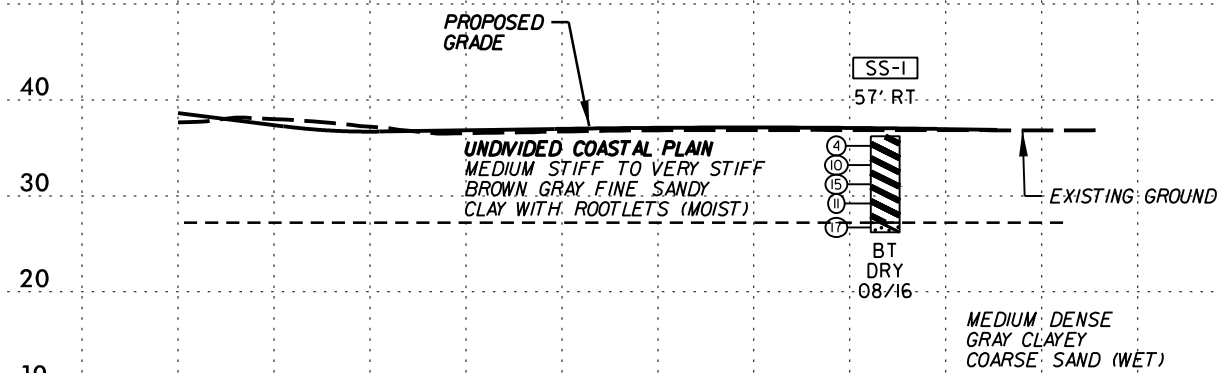
PROJECT REFERENCE NO.		SHEET NO.	
R-5703		76	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
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<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			



—Y9—

## SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				%	%
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200	MOISTURE	ORGANIC
SS-1	57' RT	13 + 69	2.0 - 3.5	A-7-6. (14)	42	25	9	31	14	46	100	97	91	65.4	25.3	ND



\$\$\$\$SYTIME\$\$\$\$  
 \$\$\$\$DCN\$\$\$\$  
 \$\$\$\$USERNAME\$\$\$



5/14/99

-DR4-

PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**78**

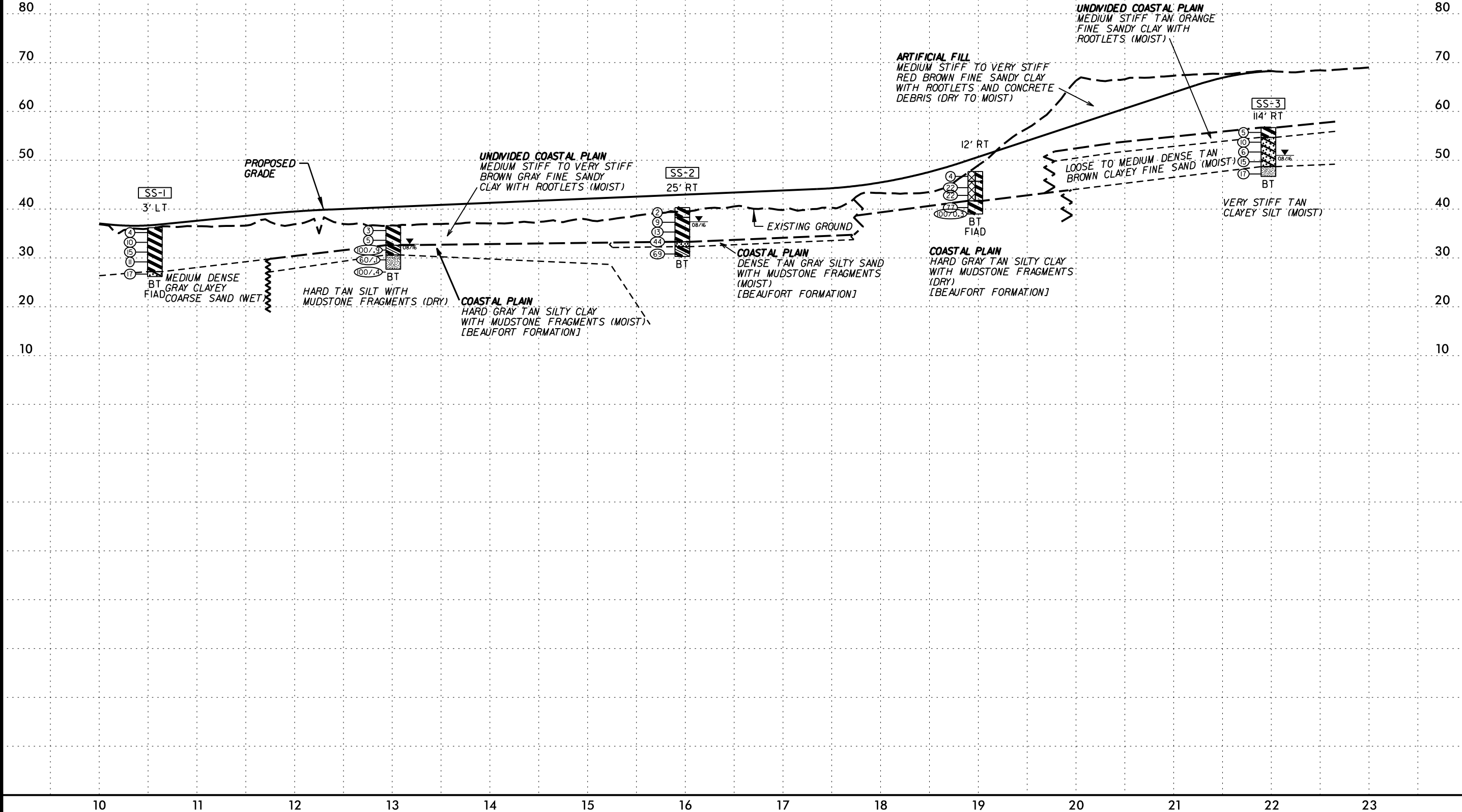
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-1	3' LT	10+57	2.0 - 3.5	A-7-6 (14)	42	25	9	31	14	46	100	97	91	65.4	25.3	ND
SS-2	25' RT	15+97	2.0 - 3.5	A-7-6 (21)	50	26	6	15	21	58	95	93	89	77.8	32.6	ND
SS-3	114' RT	21+97	2.0 - 3.5	A-2-6 (0)	36	12	38	34	11	17	97	80	60	28.3	27.4	ND



5/14/99

-SERV1-

PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**79**

ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

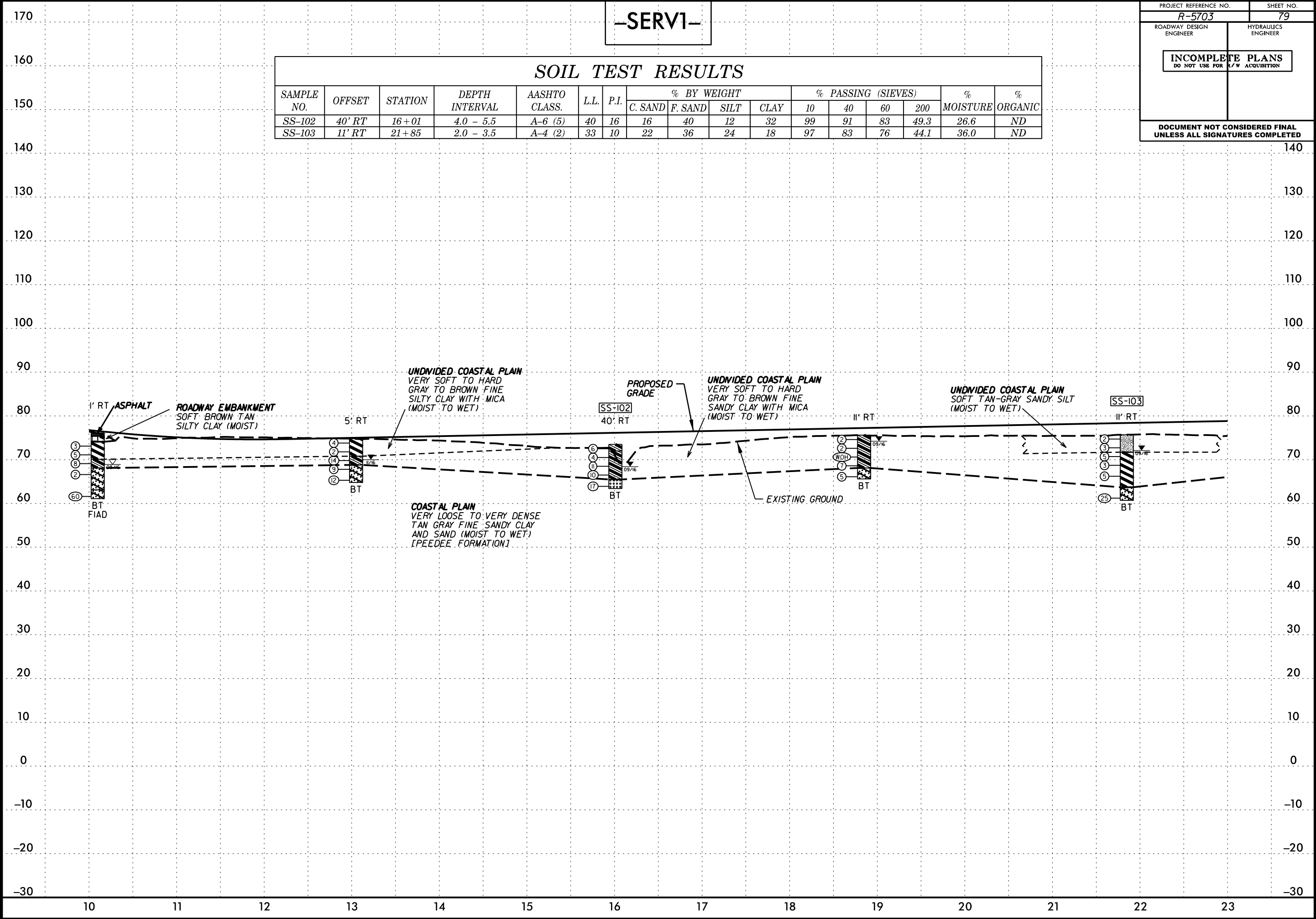
INCOMPLETE PLANS

DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-102	40' RT	16+01	4.0 - 5.5	A-6 (5)	40	16	16	40	12	32	99	91	83	49.3	26.6	ND
SS-103	11' RT	21+85	2.0 - 3.5	A-4 (2)	33	10	22	36	24	18	97	83	76	44.1	36.0	ND



5/14/99

-SERV1-

PROJECT REFERENCE NO.  
*R-5703*

SHEET NO.  
*80*

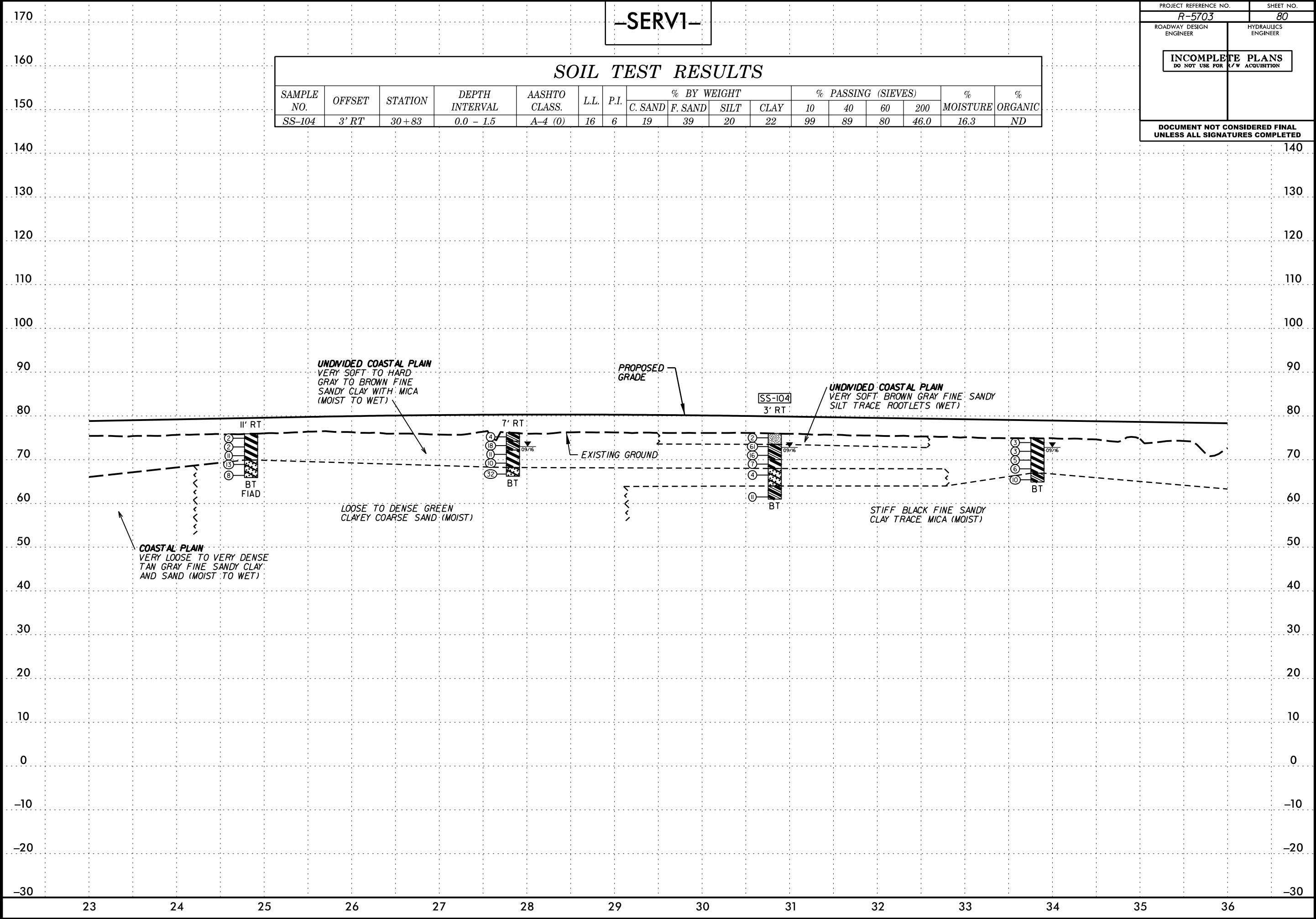
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-104	3' RT	30+83	0.0 - 1.5	A-4 (0)	16	6	19	39	20	22	99	89	80	46.0	16.3	ND



5/14/99

-SERV1-

PROJECT REFERENCE NO.  
*R-5703*

SHEET NO.  
*81*

ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

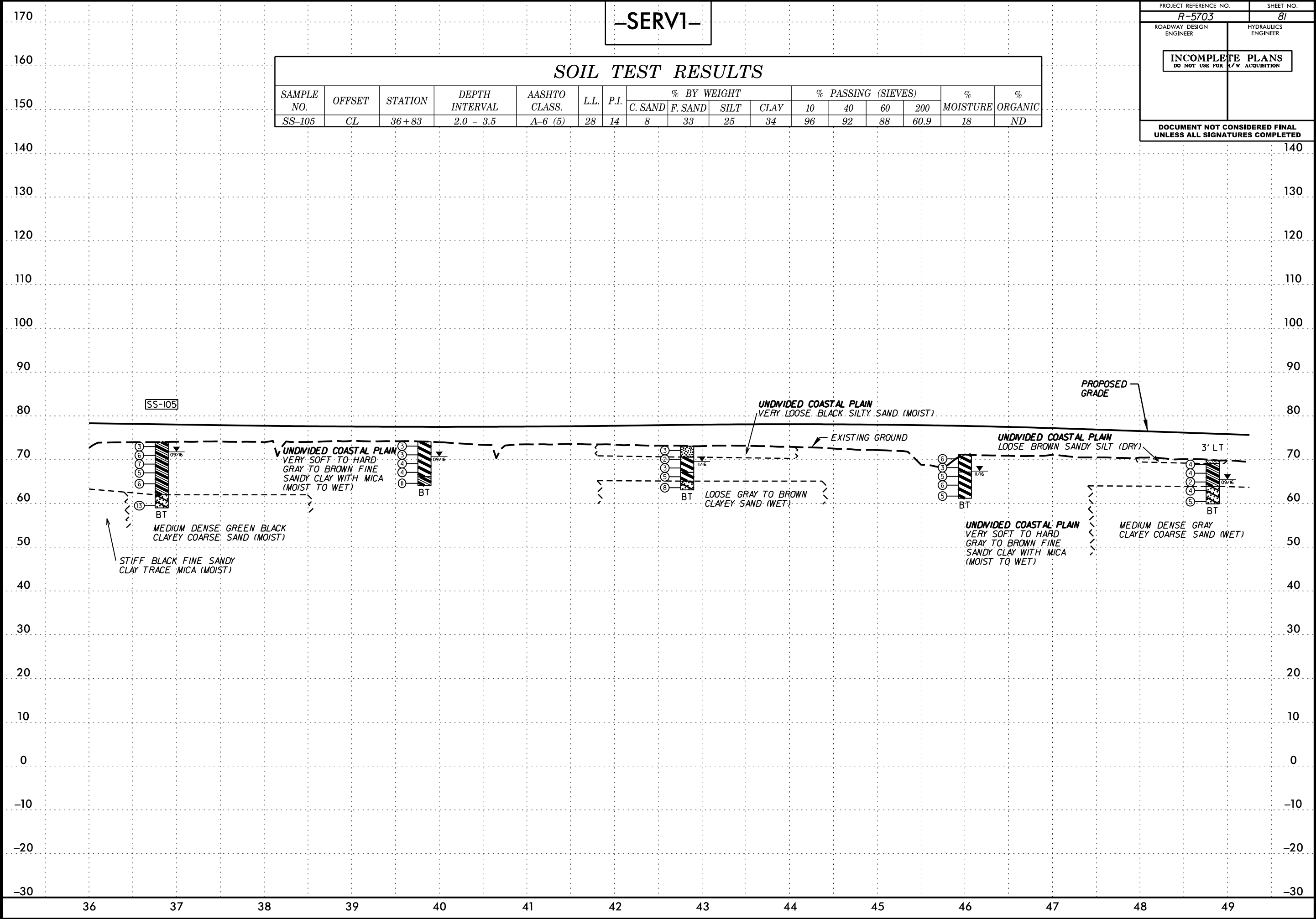
INCOMPLETE PLANS

DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-105	CL	36+83	2.0 - 3.5	A-6 (5)	28	14	8	33	25	34	96	92	88	60.9	18	ND



5/14/99

-SERV1-

PROJECT REFERENCE NO.  
**R-5703**

SHEET NO.  
**82**

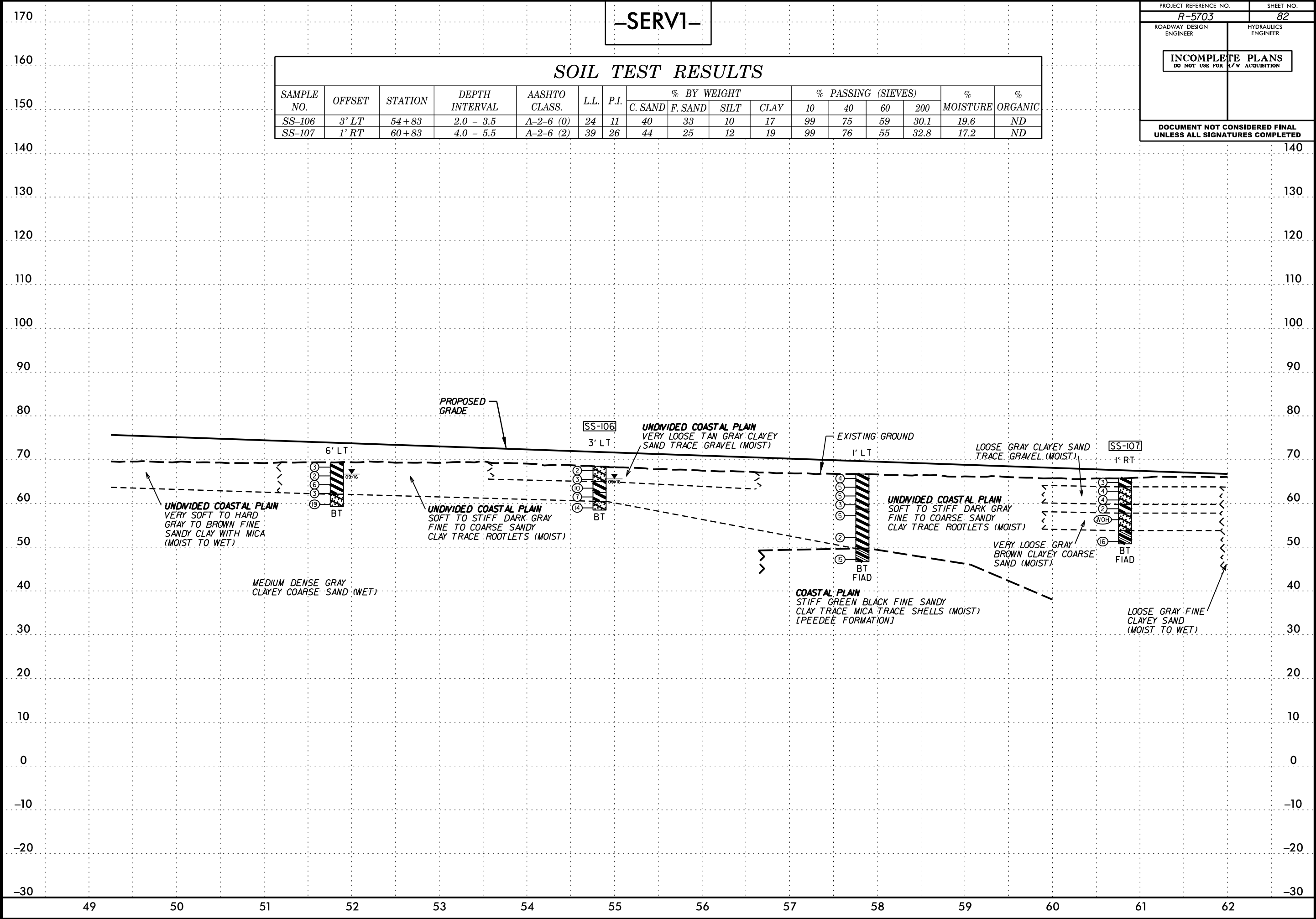
ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

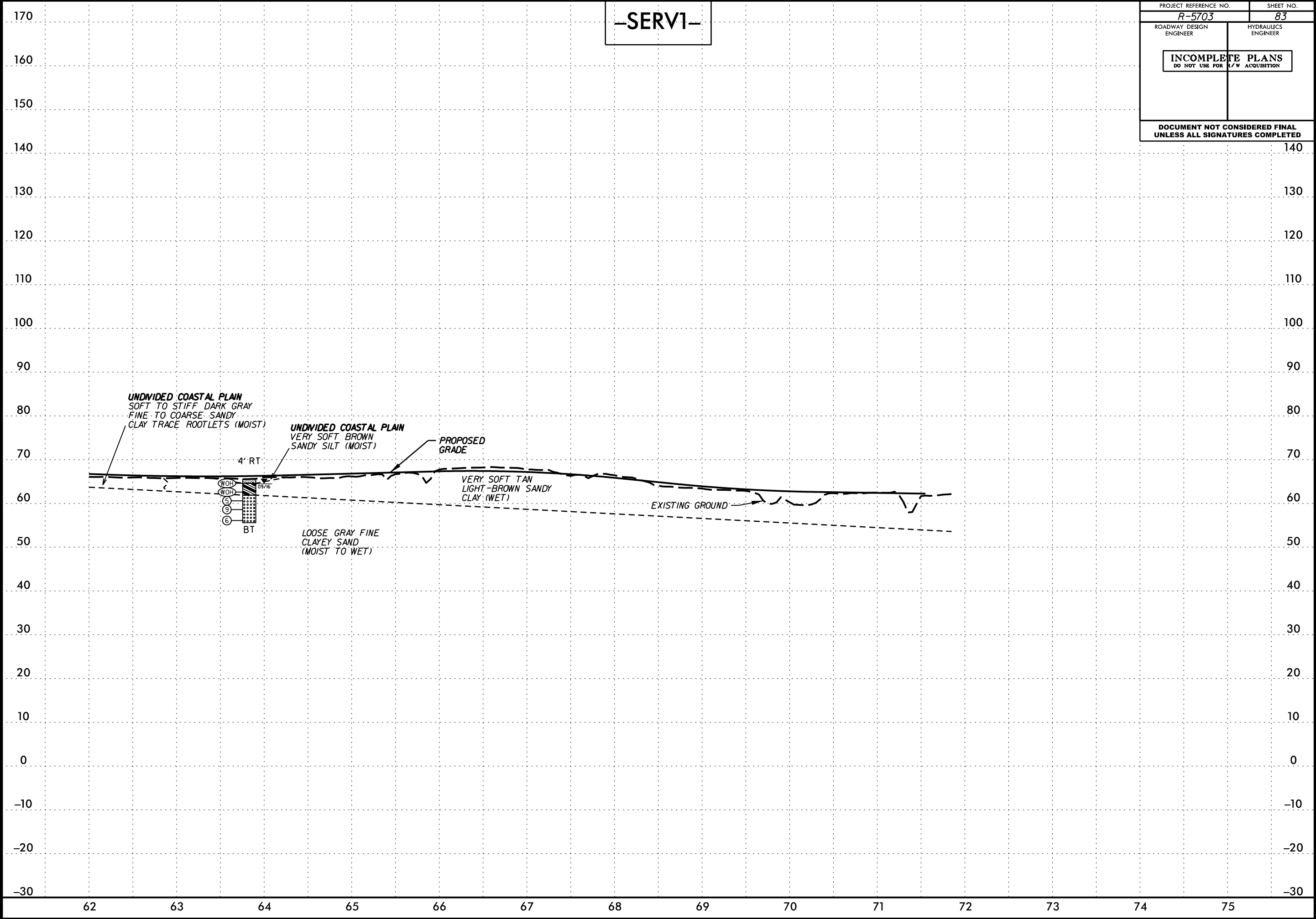
SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-106	3' LT	54+83	2.0 - 3.5	A-2-6 (0)	24	11	40	33	10	17	99	75	59	30.1	19.6	ND
SS-107	1' RT	60+83	4.0 - 5.5	A-2-6 (2)	39	26	44	25	12	19	99	76	55	32.8	17.2	ND



5/14/99

-SERV1-

PROJECT REFERENCE NO.		SHEET NO.	
R-5703		83	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div>INCOMPLETE PLANS</div> <div>DO NOT USE FOR R/W ACQUISITION</div>			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

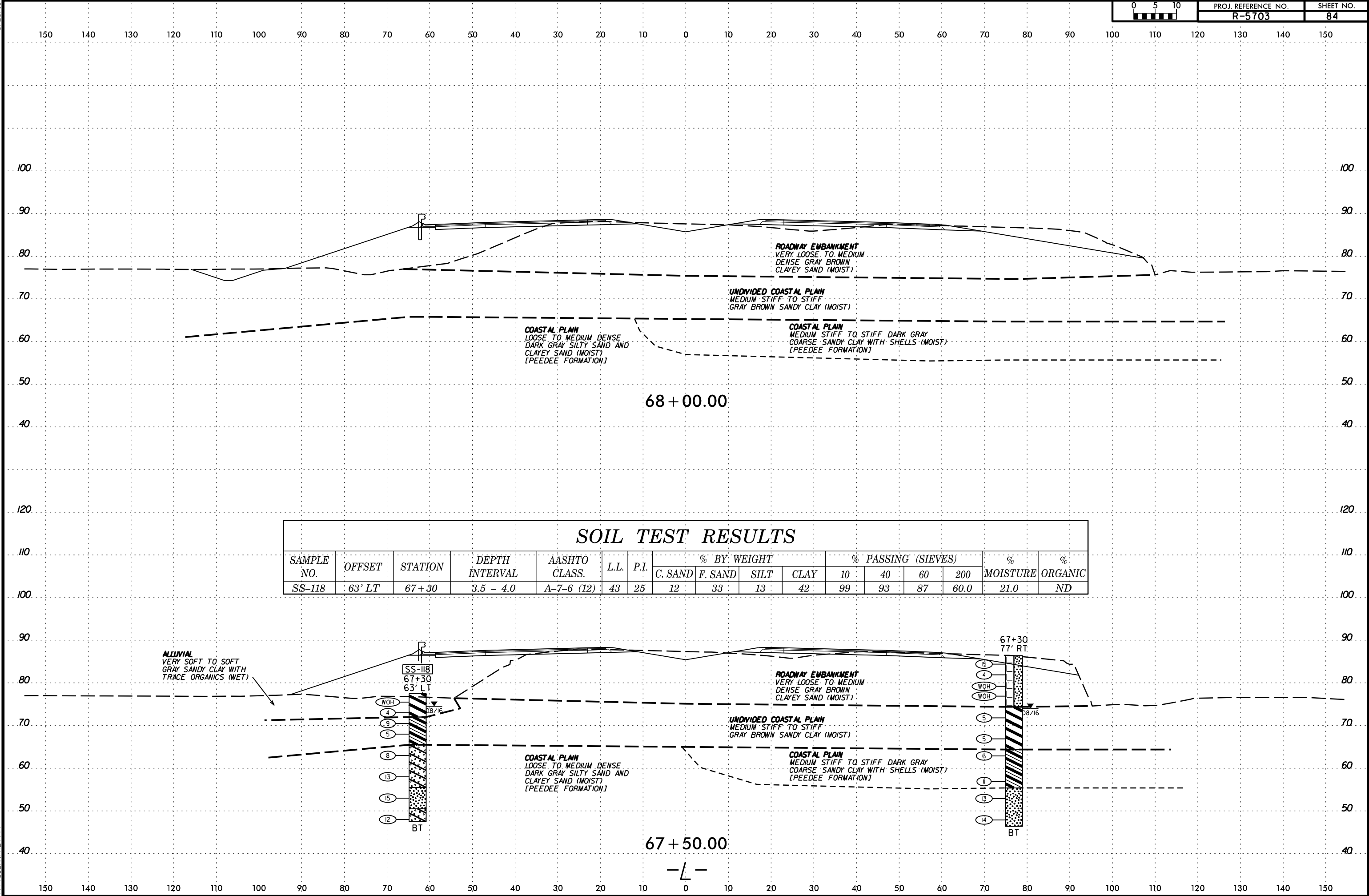


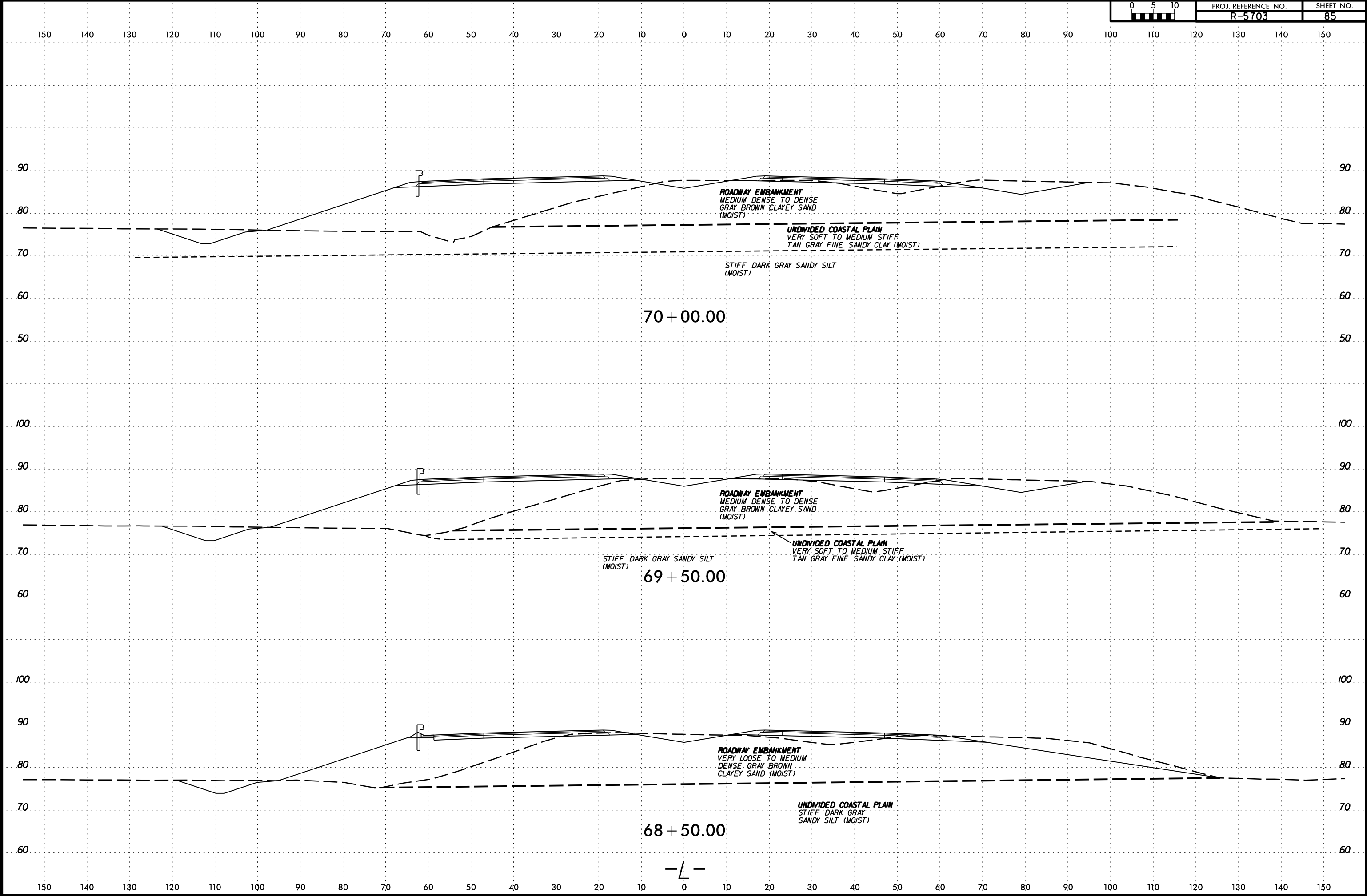
TIME  
DESIGN  
DRAWING

6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	84







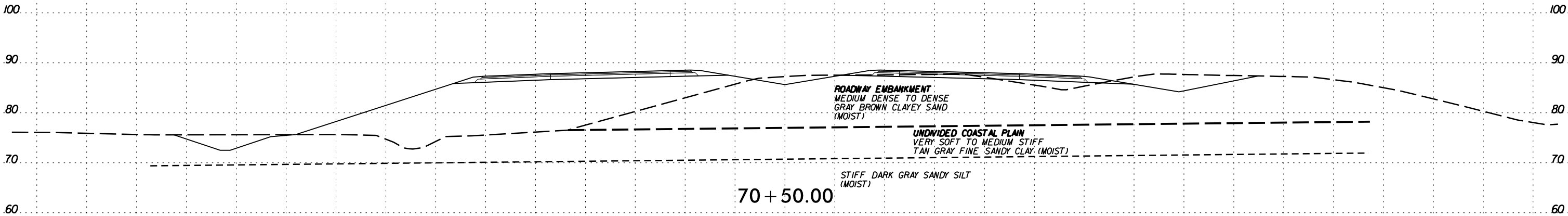
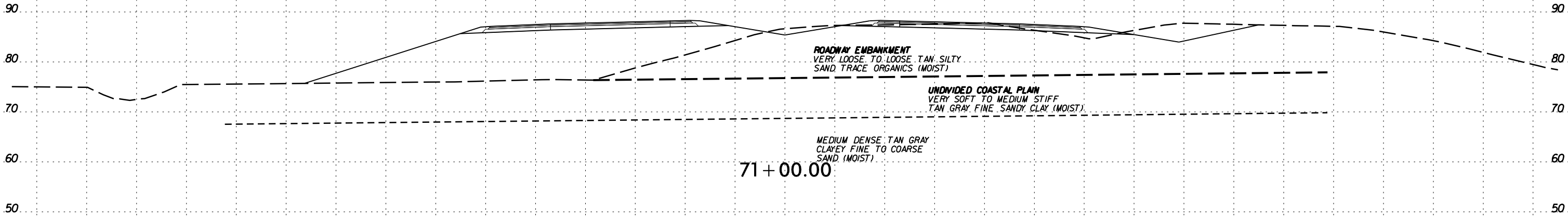
6/23/16



PROJ. REFERENCE NO.  
R-5703

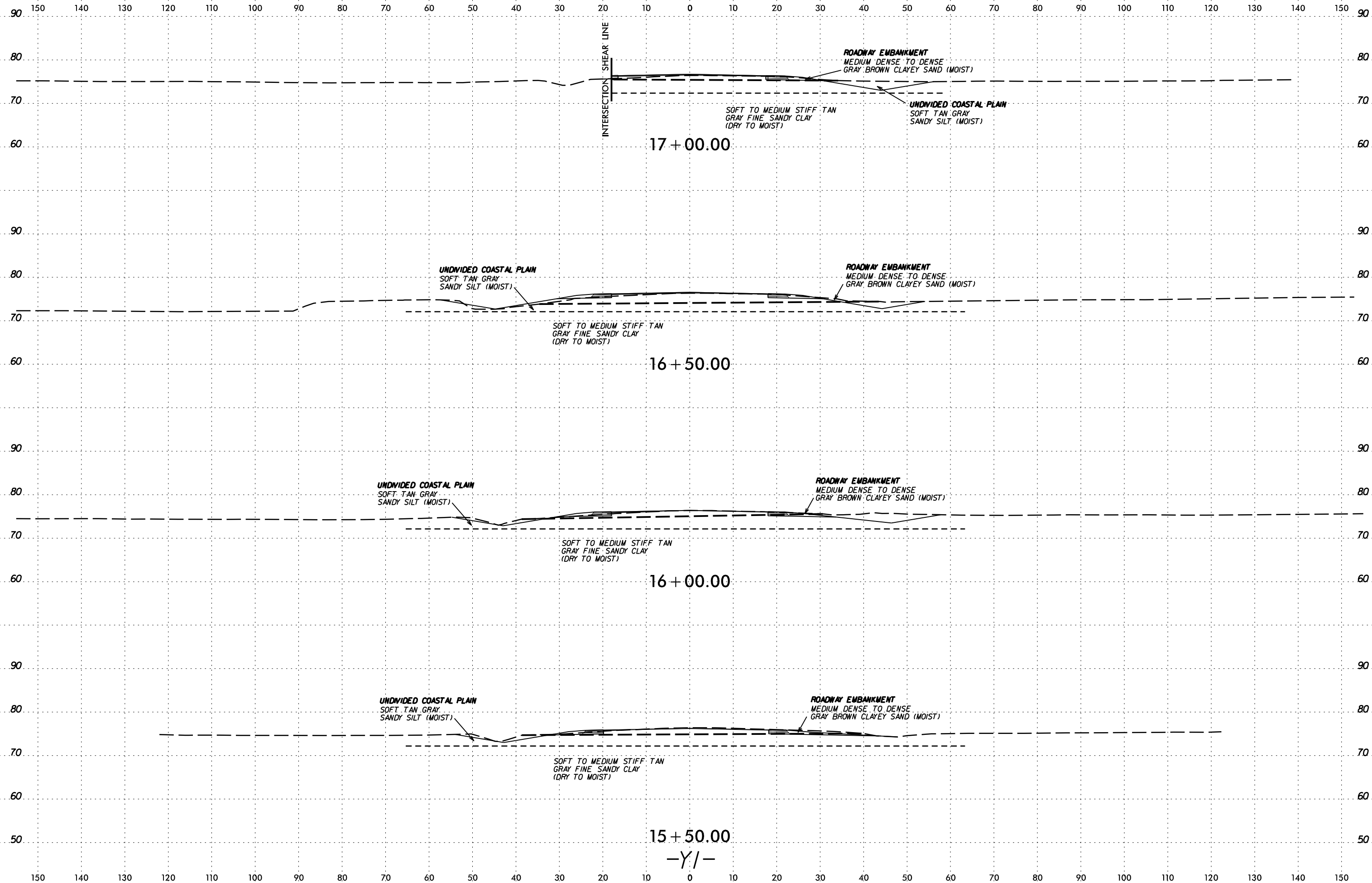
SHEET NO.  
86

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—L—

SECTION SHOWN  
SURFACE



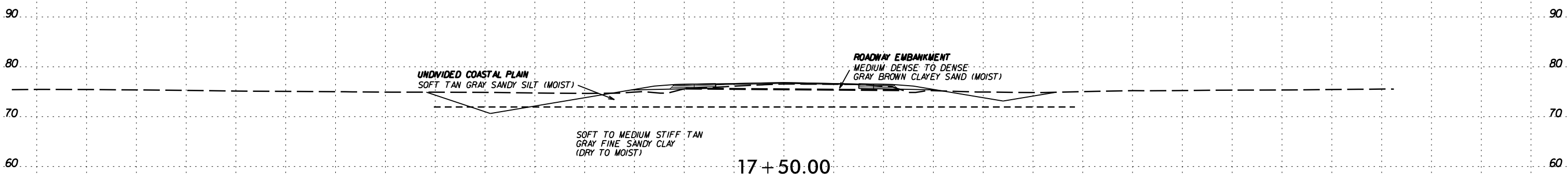
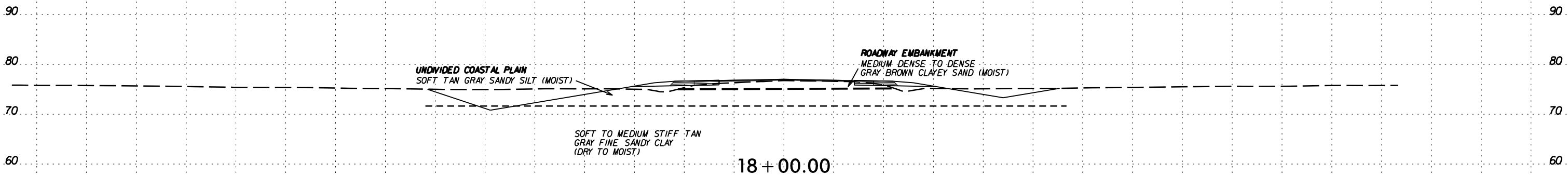
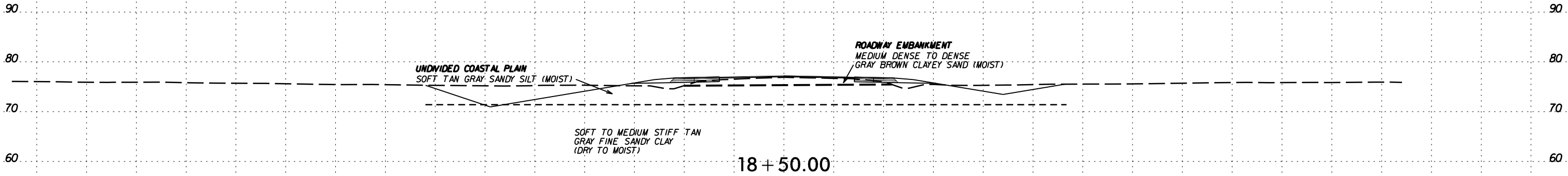
6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
88

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

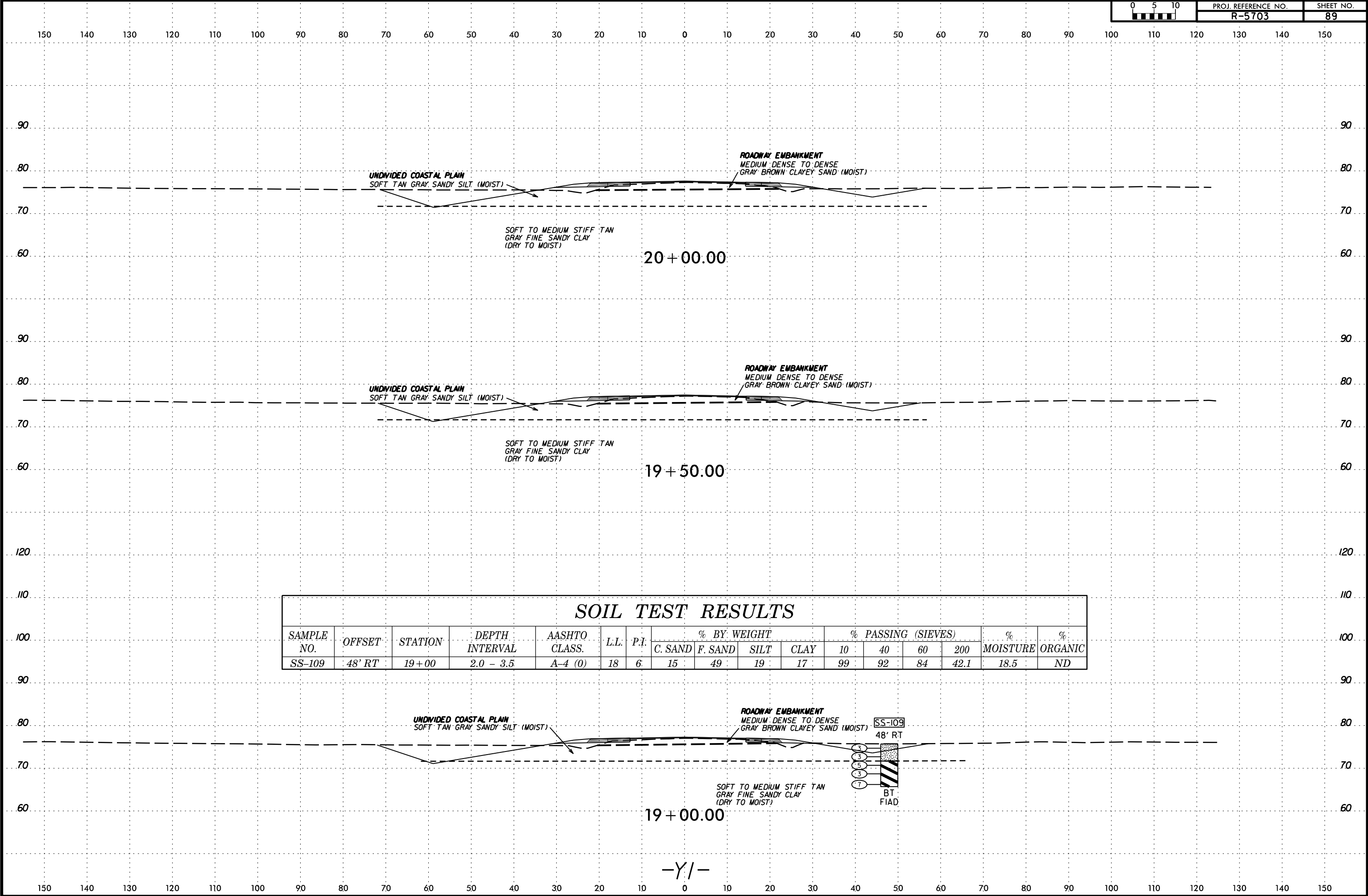


-Y/-

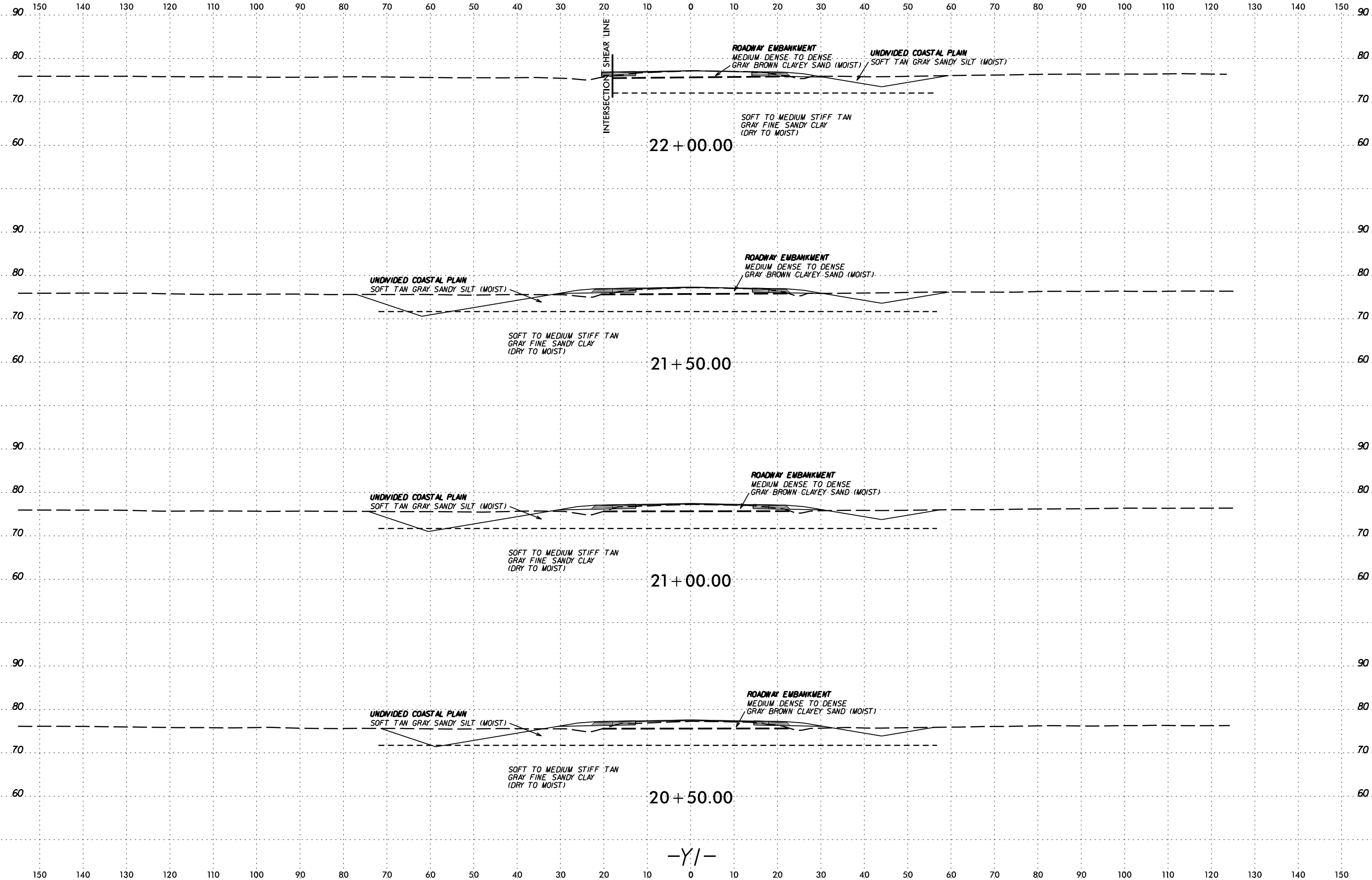
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

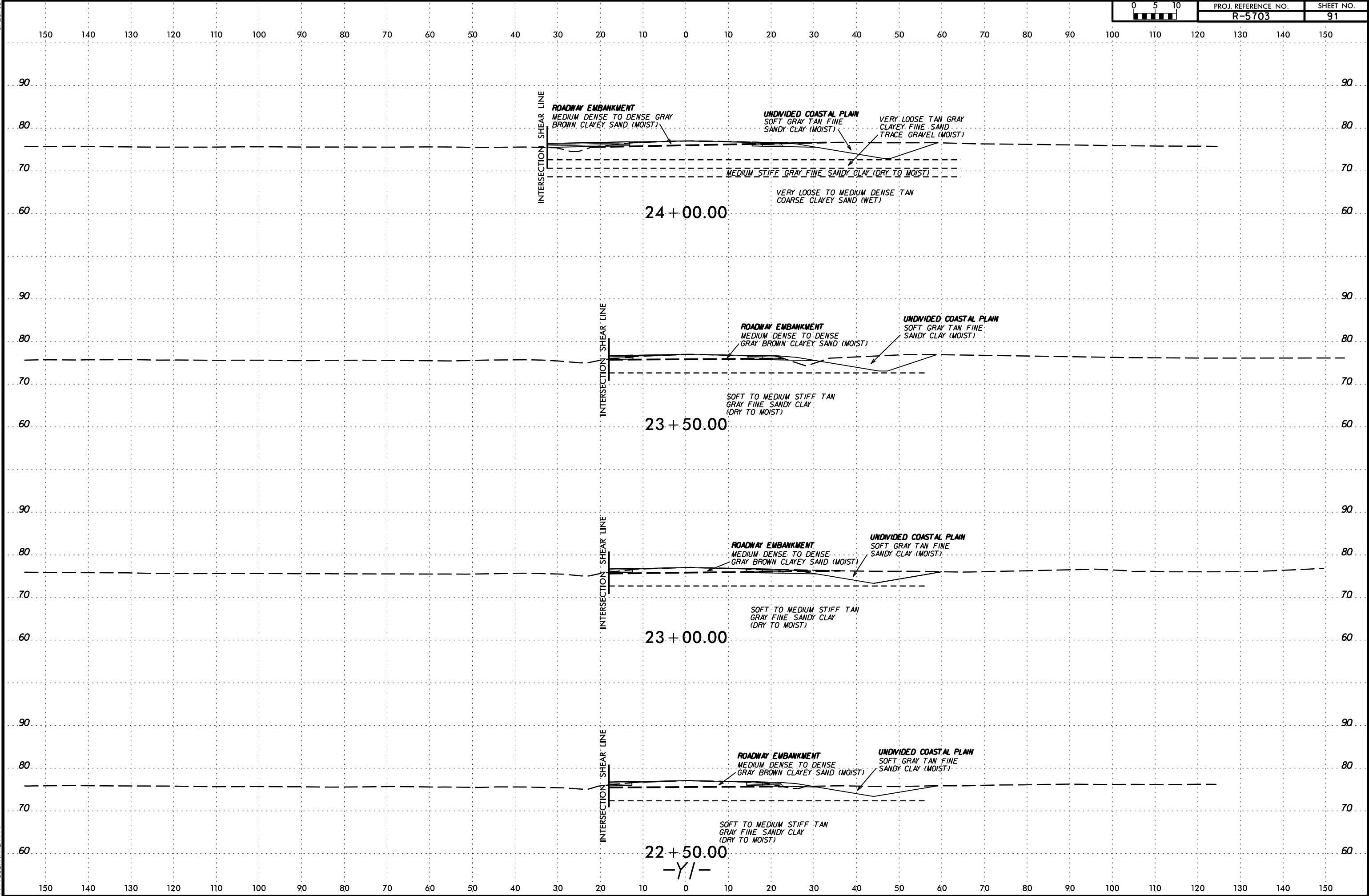
SYNOPSIS OF SOILS  
SECTION  
SUBSTRATE

6/23/16



6/23/16  
SS-109  
48' RT  
BT  
FIAD

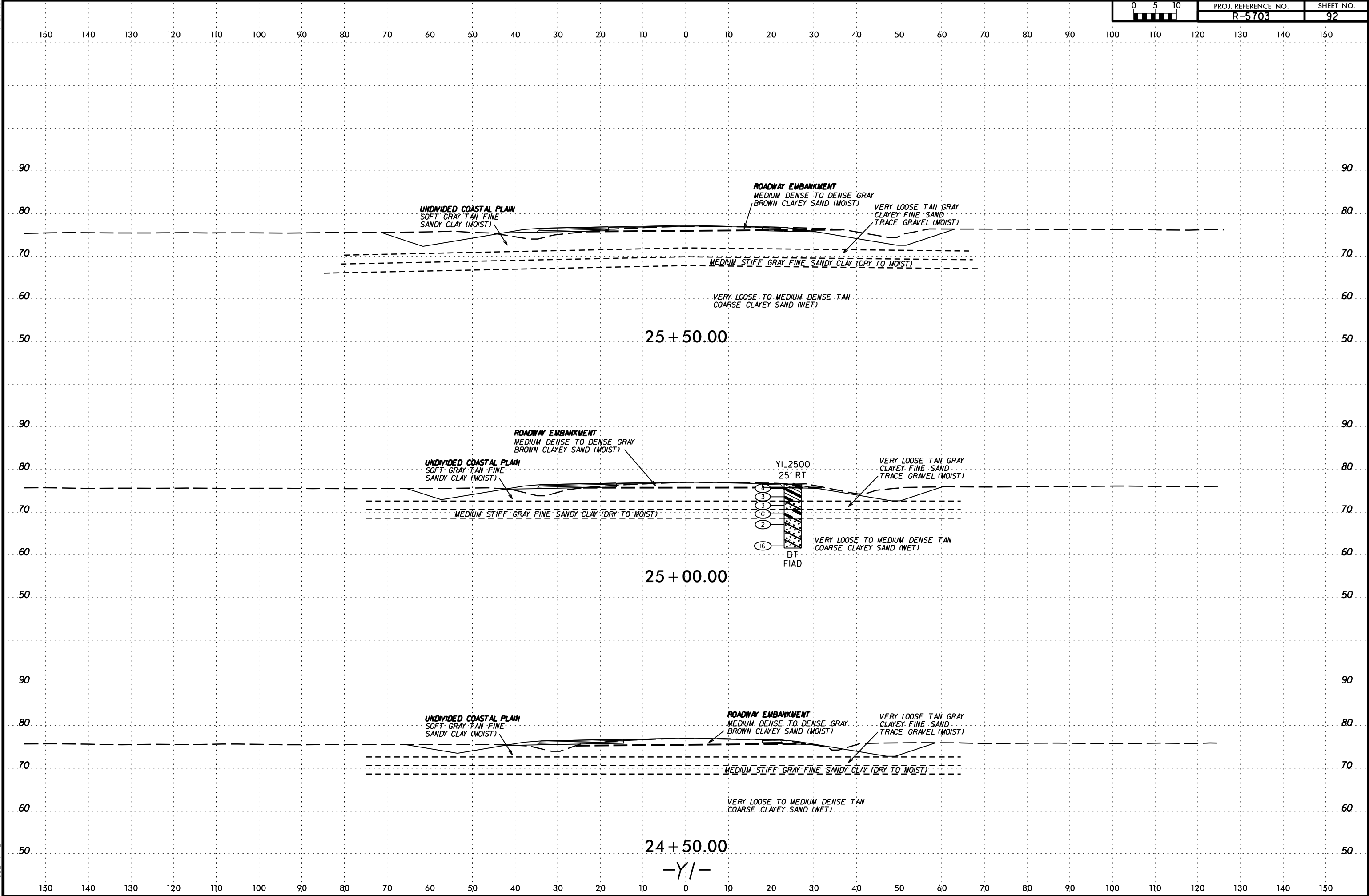




6/23/16



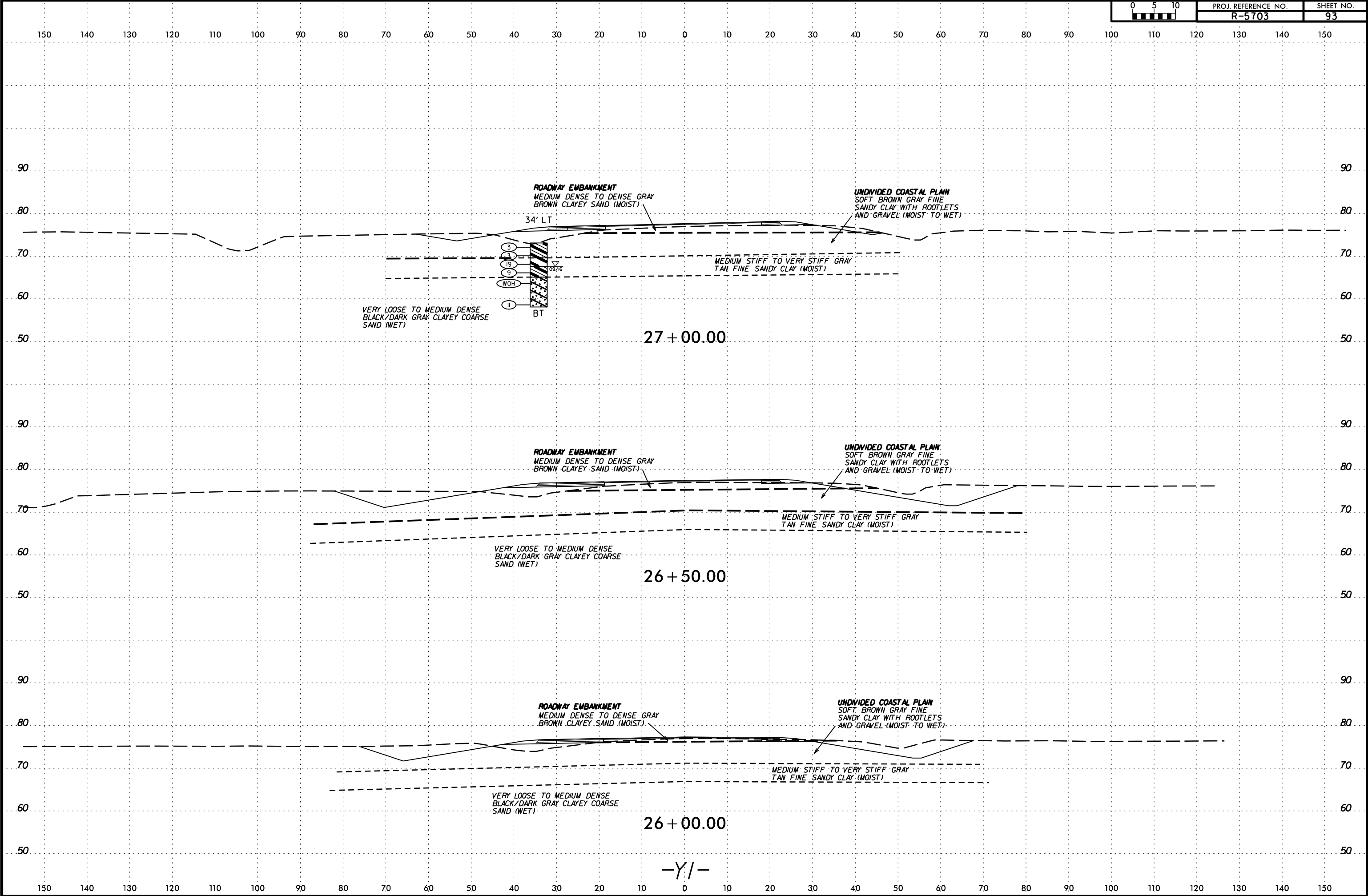
PROJ. REFERENCE NO.	SHEET NO.
R-5703	92



6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	93



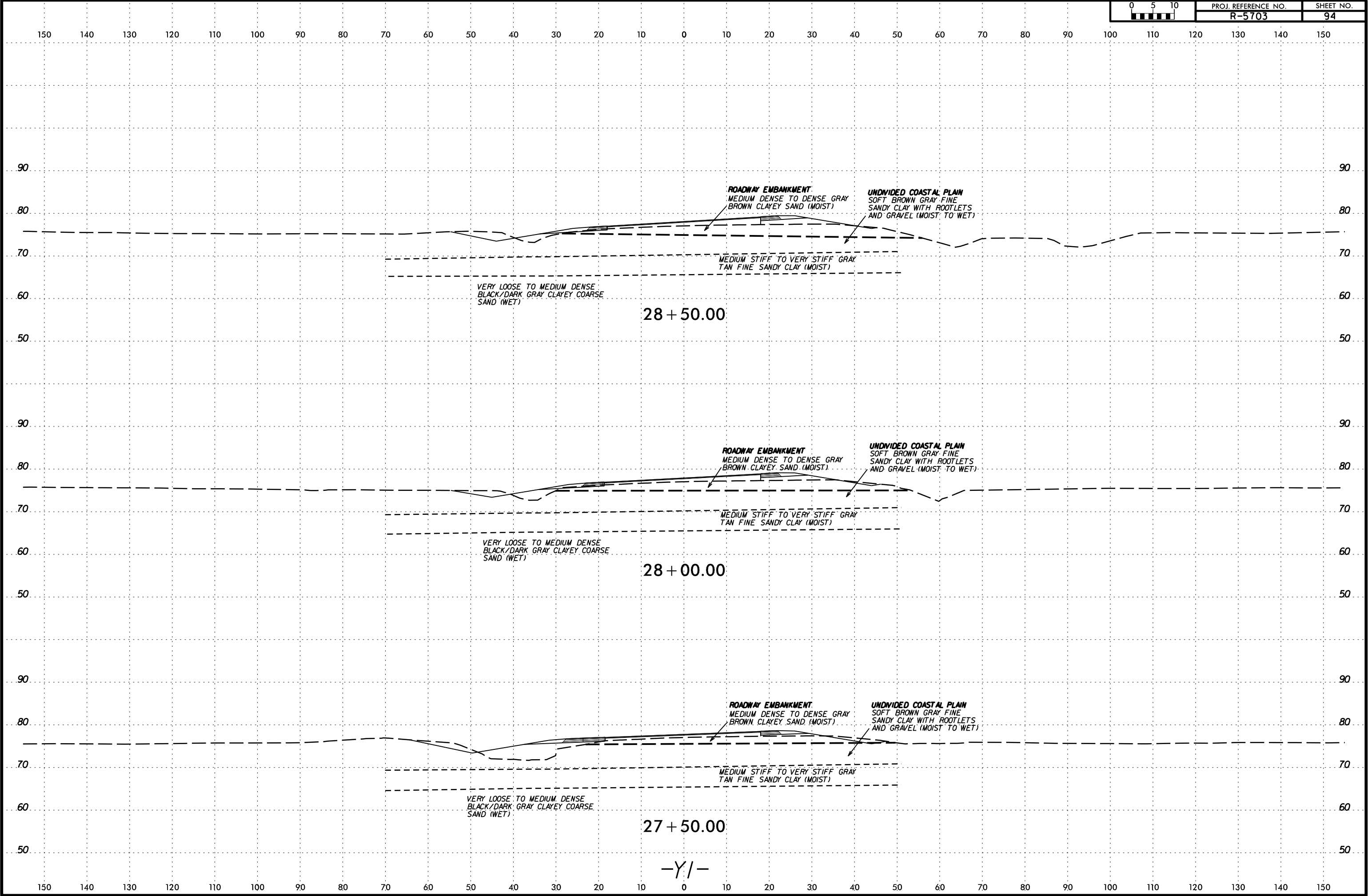


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
94



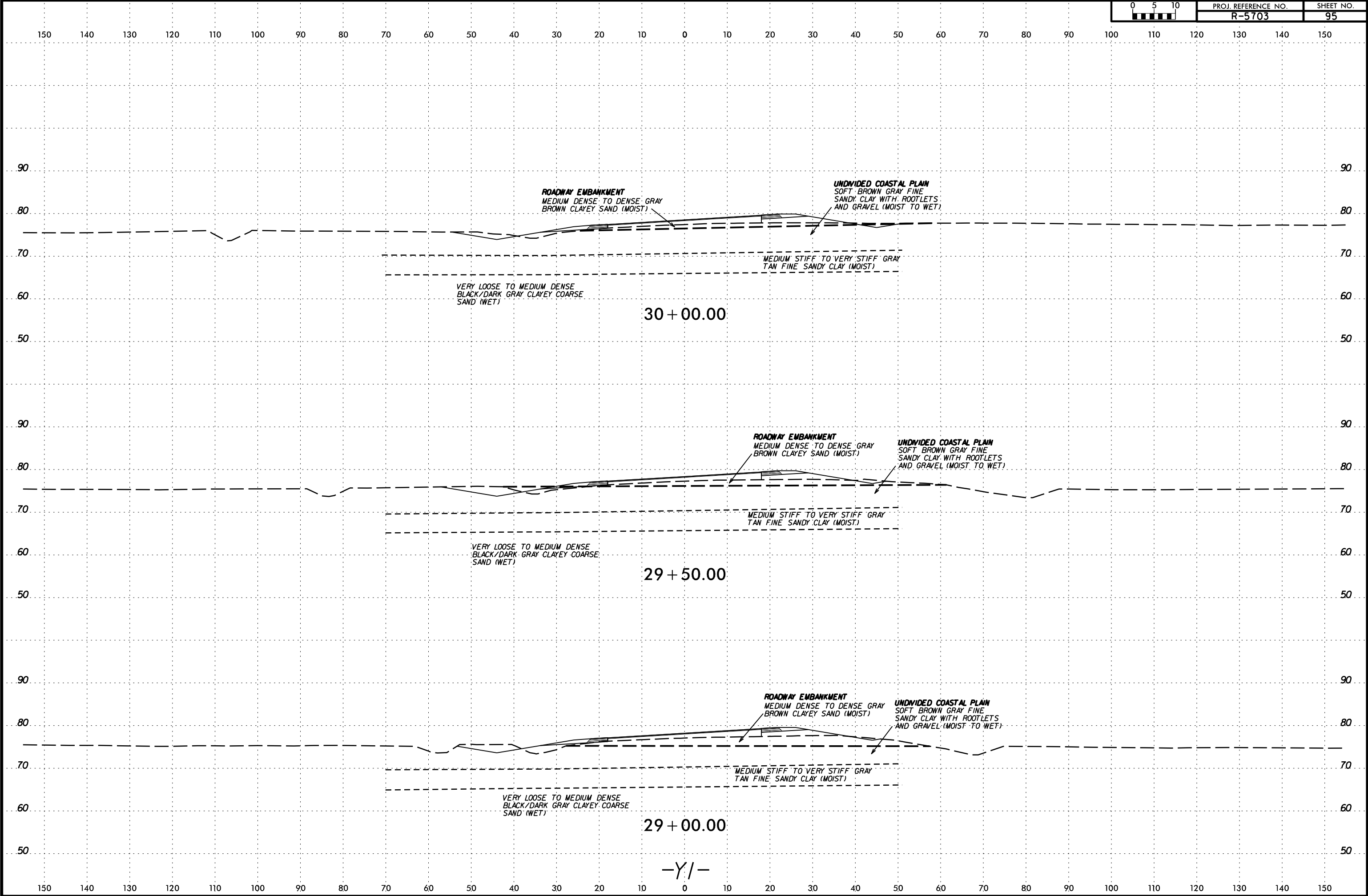
SECTION 28+50.00  
SECTION 28+00.00  
SECTION 27+50.00  
SECTION 27+00.00  
SECTION 26+50.00  
SECTION 26+00.00  
SECTION 25+50.00  
SECTION 25+00.00  
SECTION 24+50.00  
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SECTION 8+00.00  
SECTION 7+50.00  
SECTION 7+00.00  
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SECTION 4+00.00  
SECTION 3+50.00  
SECTION 3+00.00  
SECTION 2+50.00  
SECTION 2+00.00  
SECTION 1+50.00  
SECTION 1+00.00  
SECTION 0+50.00  
SECTION 0+00.00

6/23/16

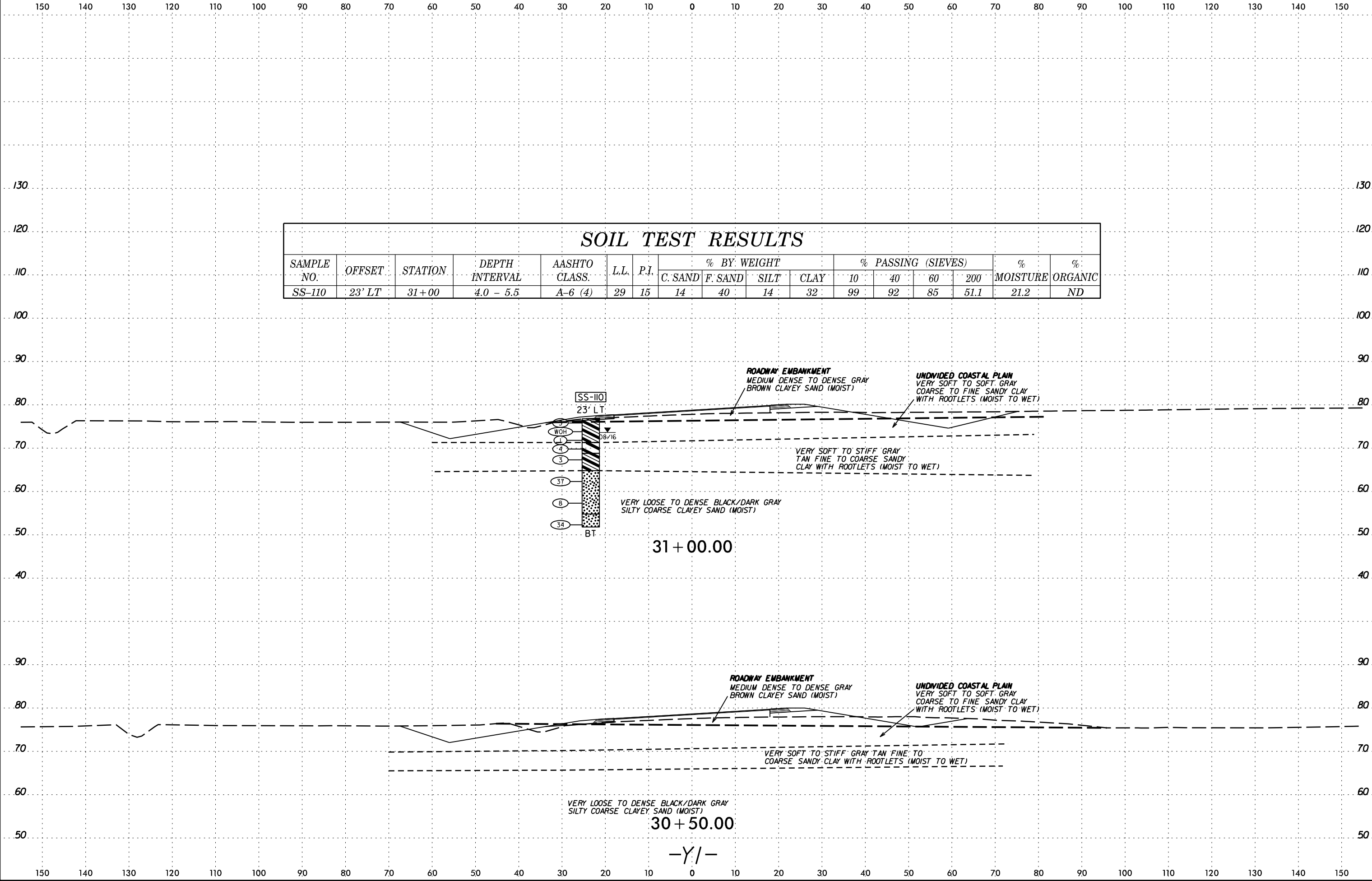


PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
95



6/23/16

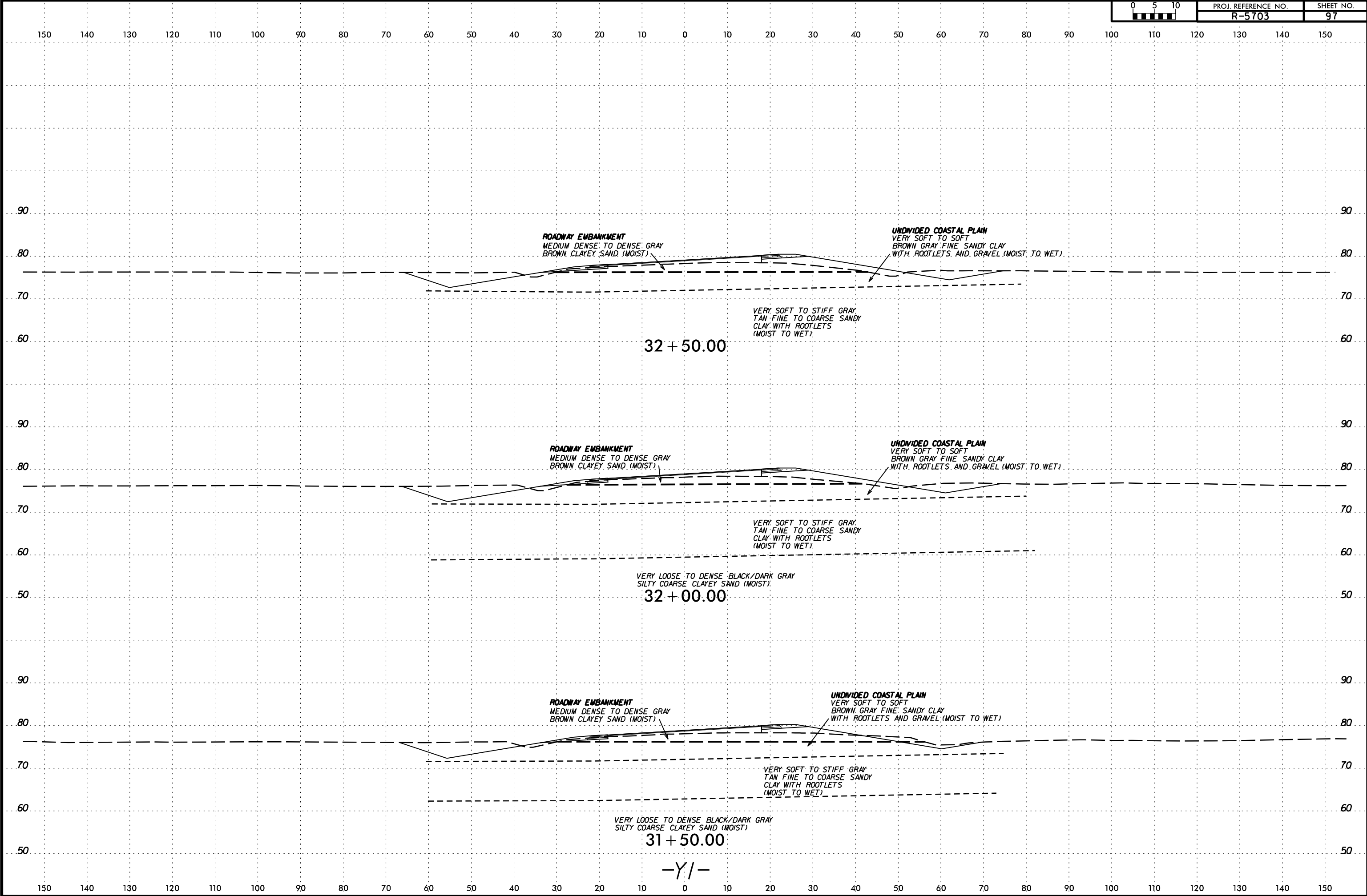


6/23/16



PROJ. REFERENCE NO.  
R-5703

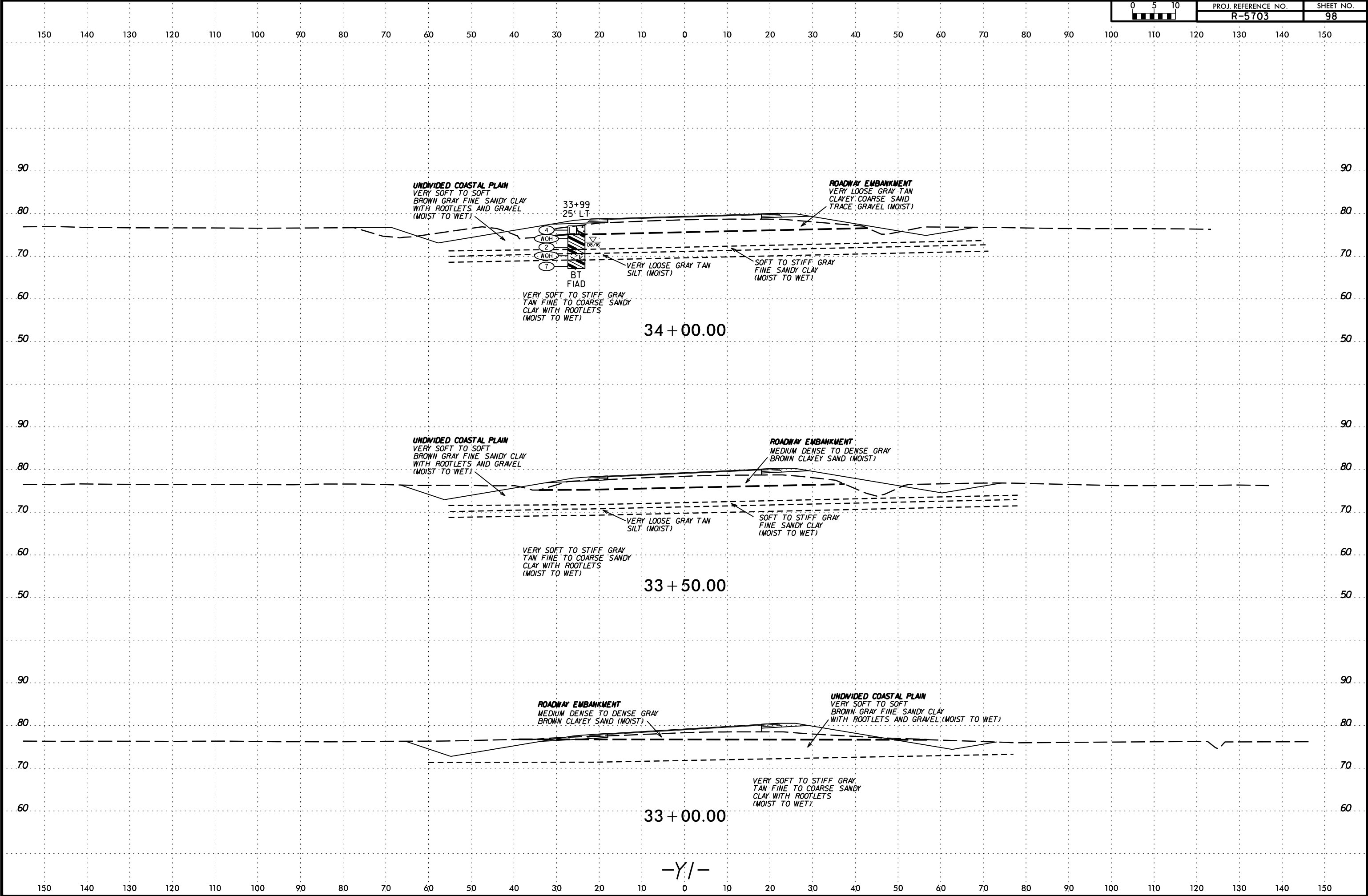
SHEET NO.  
97



6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	98

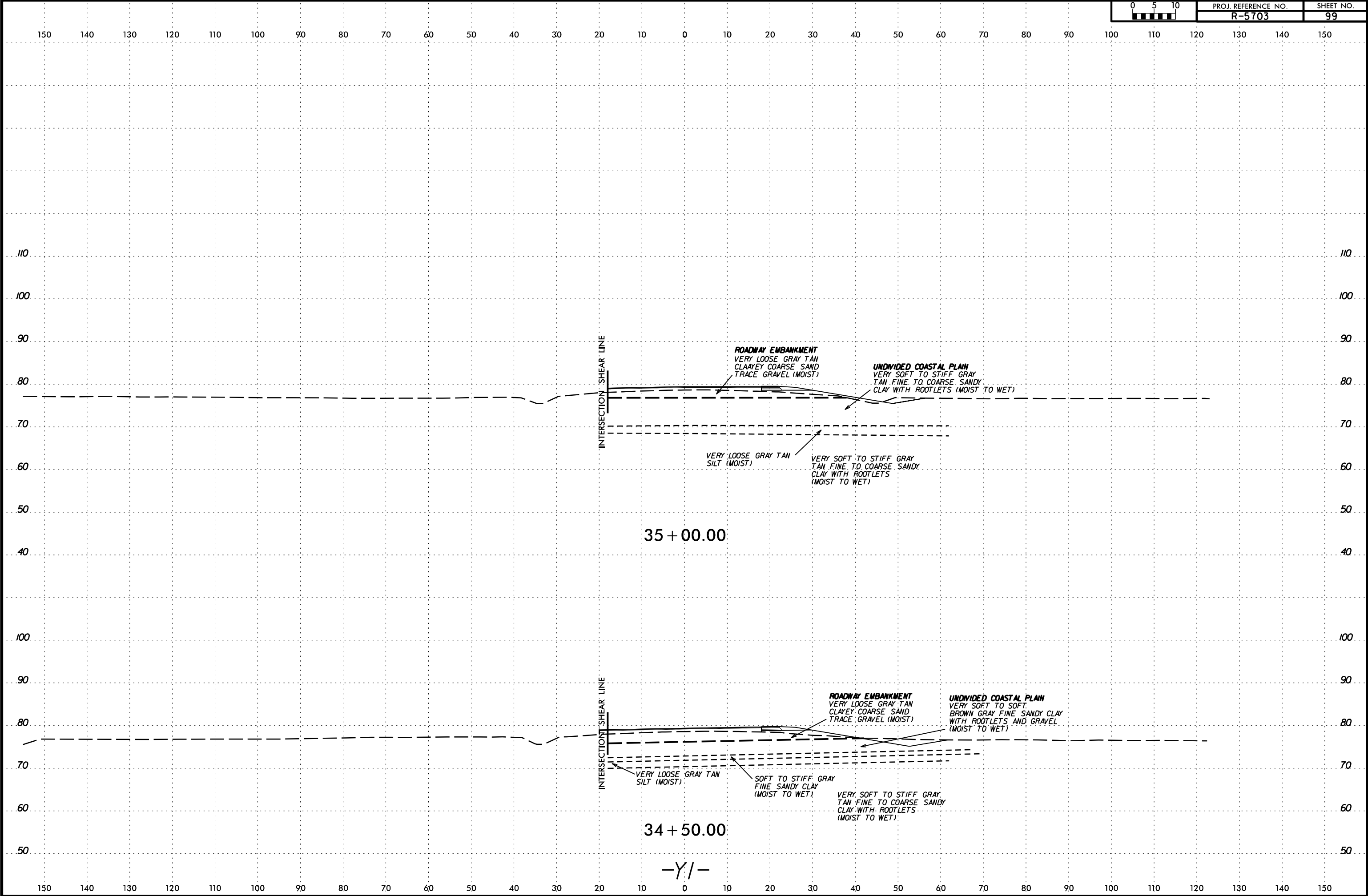


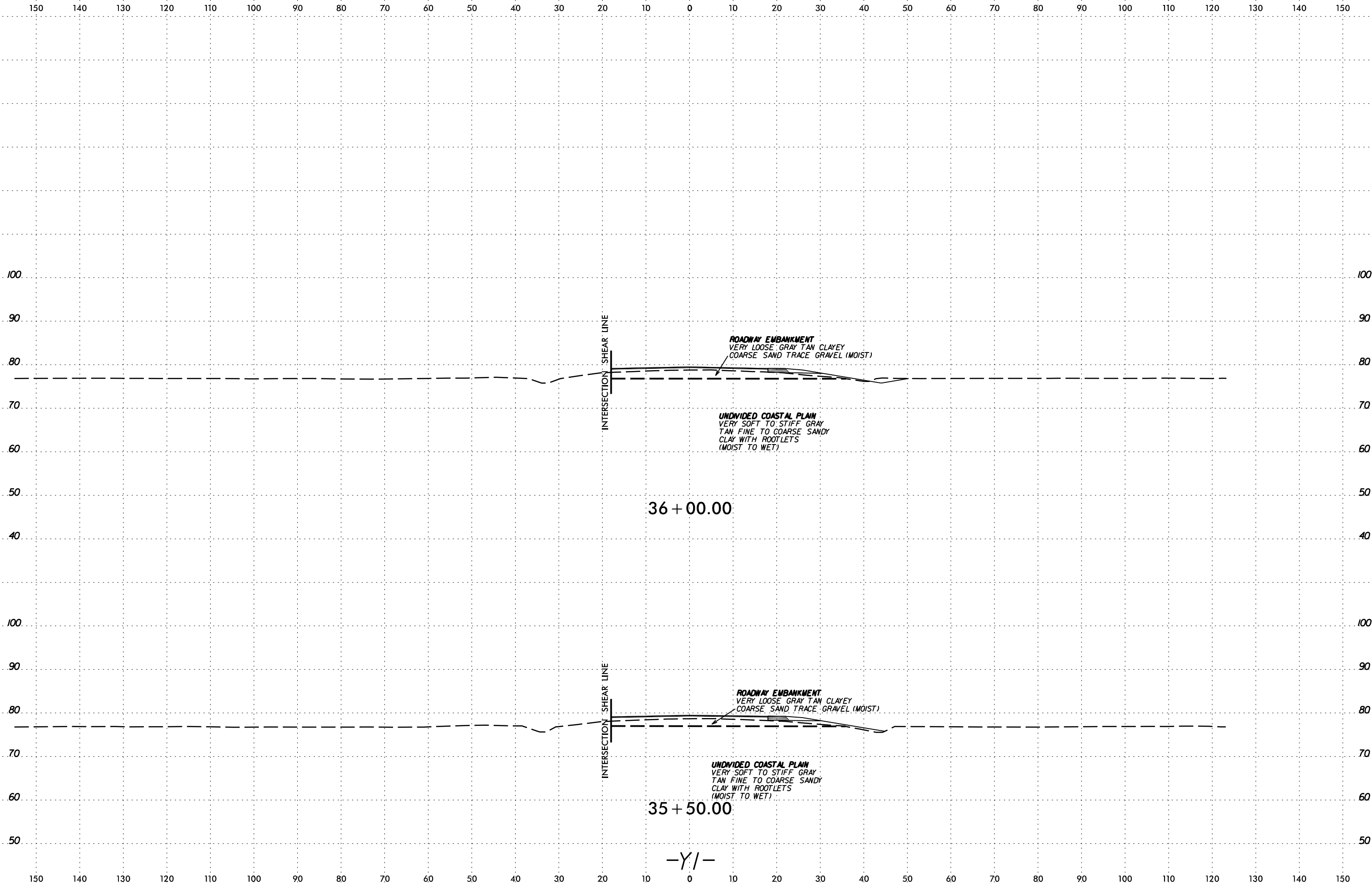
6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
99





6/23/16

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-111	71' RT	37+02	2.0 - 3.5	A-6 (0)	33	18	17	42	15	26	99	90	82	46.1	18.6	ND

UNDIVIDED COASTAL PLAIN  
VERY SOFT TO STIFF GRAY  
TAN FINE TO COARSE SANDY  
CLAY WITH ROOTLETS  
(MOIST TO WET)

ROADWAY EMBANKMENT  
VERY LOOSE GRAY TAN CLAYEY  
COARSE SAND TRACE GRAVEL (MOIST)

SS-III  
37+02  
71' RT

- 2
- 3
- 5
- 6
- 11
- 17

BT  
FIAD

LOOSE TO MEDIUM DENSE  
DARK GRAY/BLACK CLAYEY  
COARSE SAND (WET)

37 + 00.00

INTERSECTION SHEAR LINE

ROADWAY EMBANKMENT  
VERY LOOSE GRAY TAN CLAYEY  
COARSE SAND TRACE GRAVEL (MOIST)

UNDIVIDED COASTAL PLAIN  
VERY SOFT TO STIFF GRAY  
TAN FINE TO COARSE SANDY  
CLAY WITH ROOTLETS  
(MOIST TO WET)

LOOSE TO MEDIUM DENSE  
DARK GRAY/BLACK CLAYEY  
COARSE SAND (WET)

36 + 50.00

-Y/-

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

SYTIME  
CON  
SUPERNAME

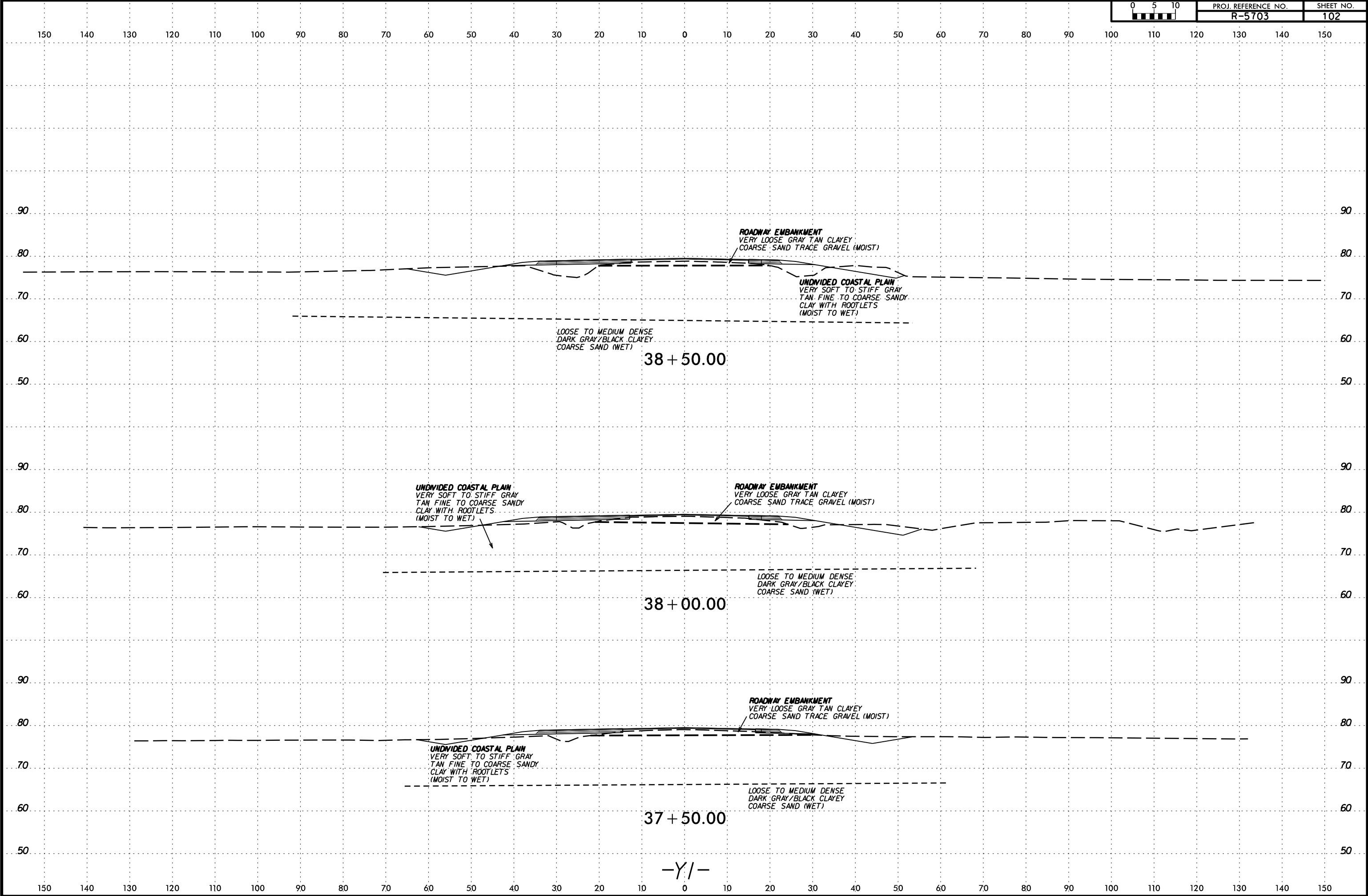


6/23/16

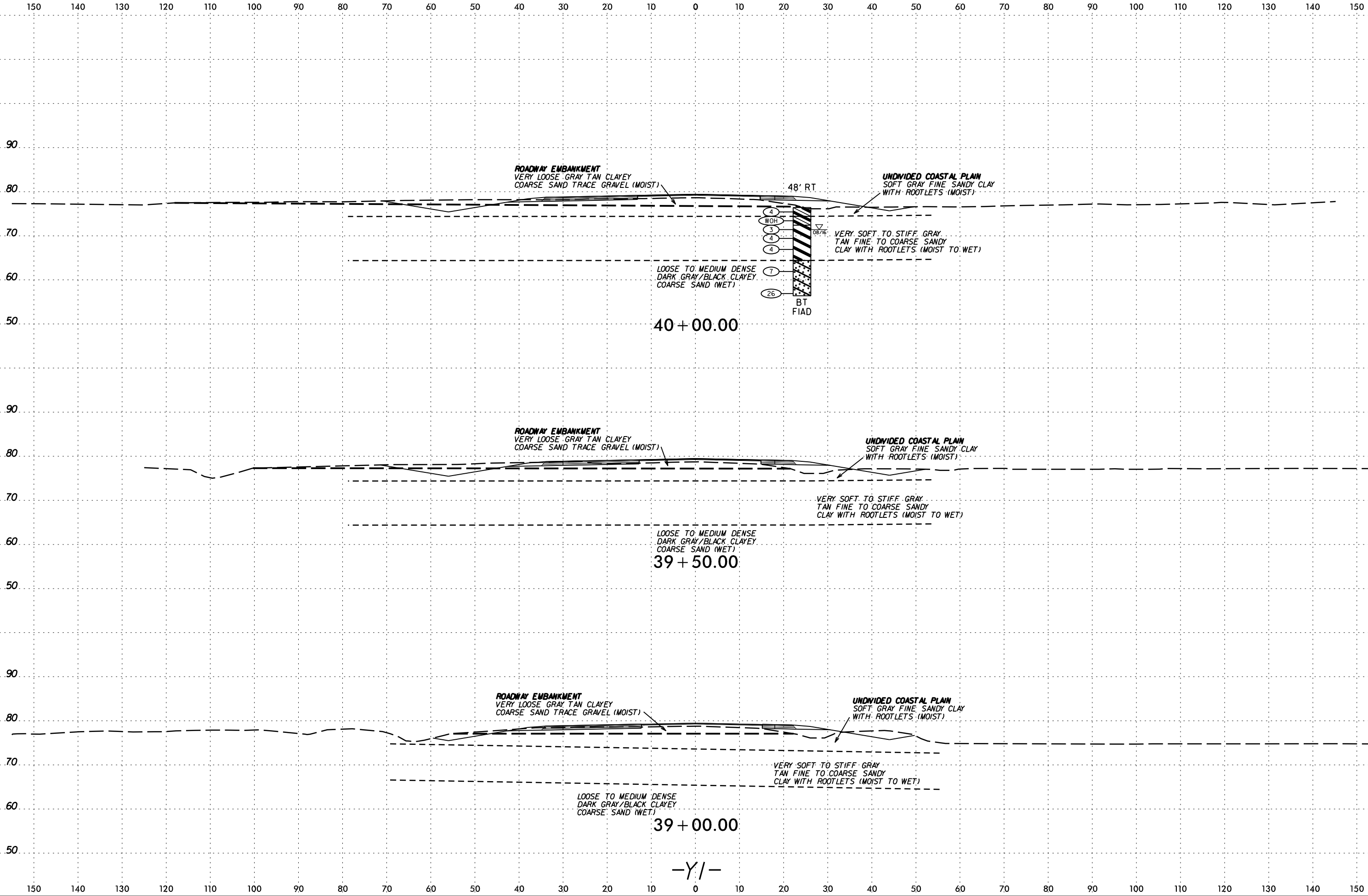


PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
102



SECTION 37+50.00 TO 38+50.00  
SUBAREA 102

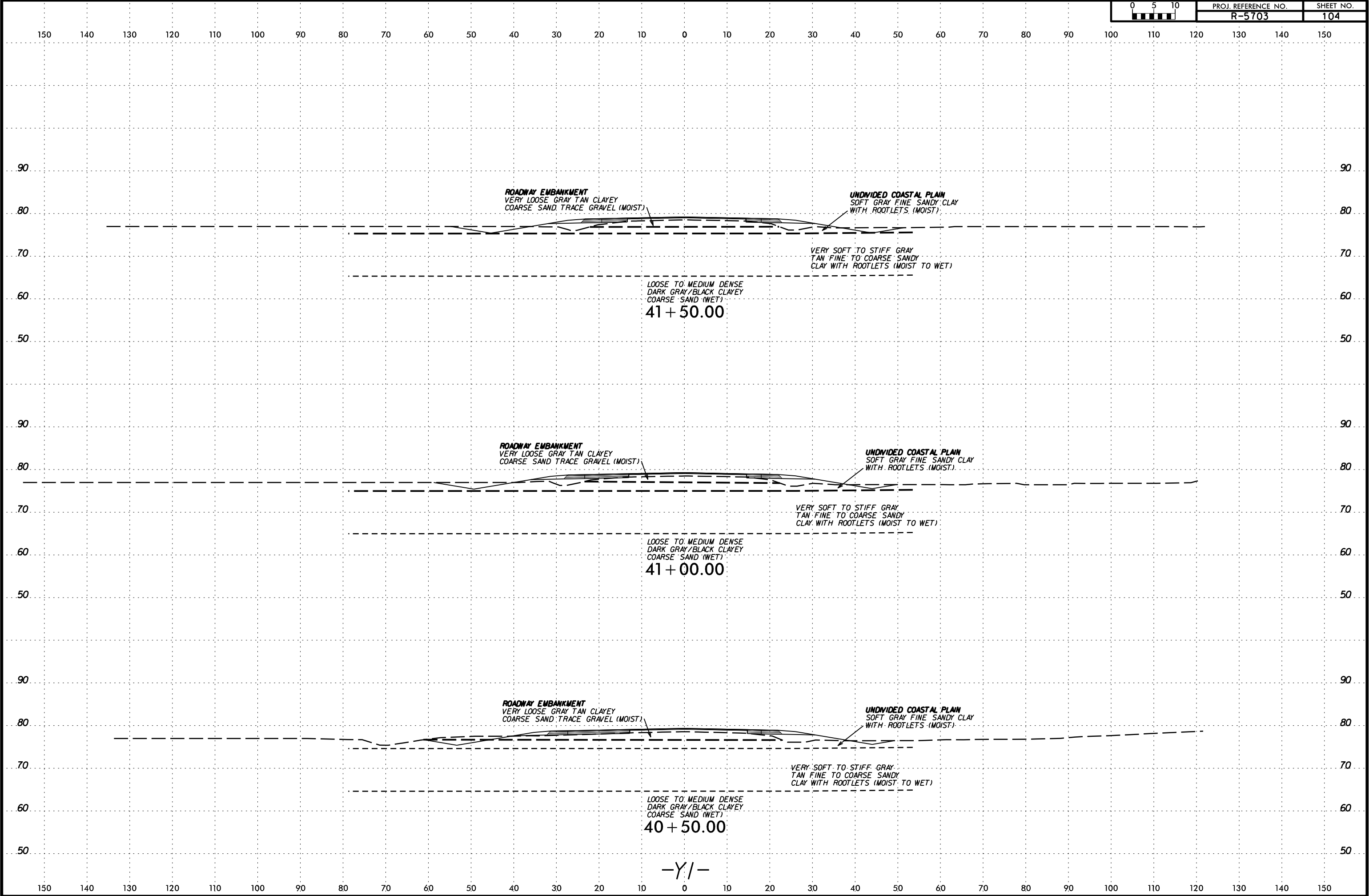


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
104

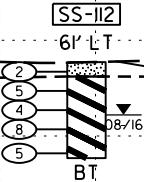


6/23/16

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-112	61' LT	43+00	0 - 1.5	A-4 (0)	20	2	21	43	20	17	97	86	77	40.8	16.2	ND



ROADWAY EMBANKMENT  
VERY LOOSE GRAY TAN CLAYEY  
COARSE SAND TRACE GRAVEL (MOIST)

UNDIVIDED COASTAL PLAIN  
VERY SOFT TAN SANDY  
SILT (MOIST)

43 + 00.00

ROADWAY EMBANKMENT  
VERY LOOSE GRAY TAN CLAYEY  
COARSE SAND TRACE GRAVEL (MOIST)

UNDIVIDED COASTAL PLAIN  
VERY SOFT TAN SANDY SILT (MOIST)

VERY SOFT TO STIFF GRAY  
TAN FINE TO COARSE SANDY  
CLAY WITH ROOTLETS (MOIST TO WET)

42 + 50.00

ROADWAY EMBANKMENT  
VERY LOOSE GRAY TAN CLAYEY  
COARSE SAND TRACE GRAVEL (MOIST)

UNDIVIDED COASTAL PLAIN  
VERY SOFT TAN SANDY SILT (MOIST)

VERY SOFT TO STIFF GRAY  
TAN FINE TO COARSE SANDY  
CLAY WITH ROOTLETS (MOIST TO WET)

LOOSE TO MEDIUM DENSE  
DARK GRAY/BLACK CLAYEY  
COARSE SAND (WET)

42 + 00.00

-Y/-

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

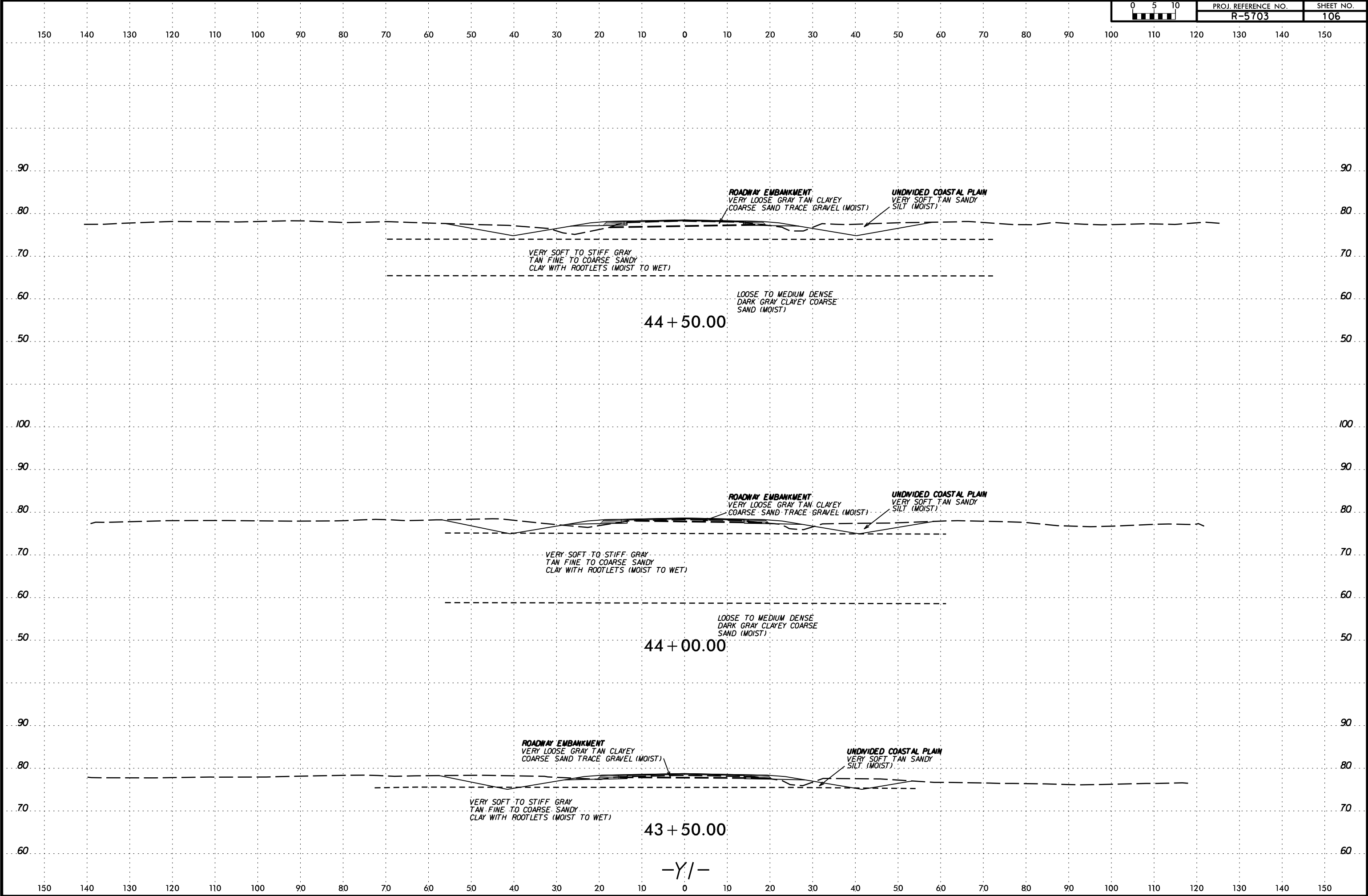
SS-112  
61' LT  
BT  
08/16

6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
106



SYNTHETIC SECTION  
SURNAME

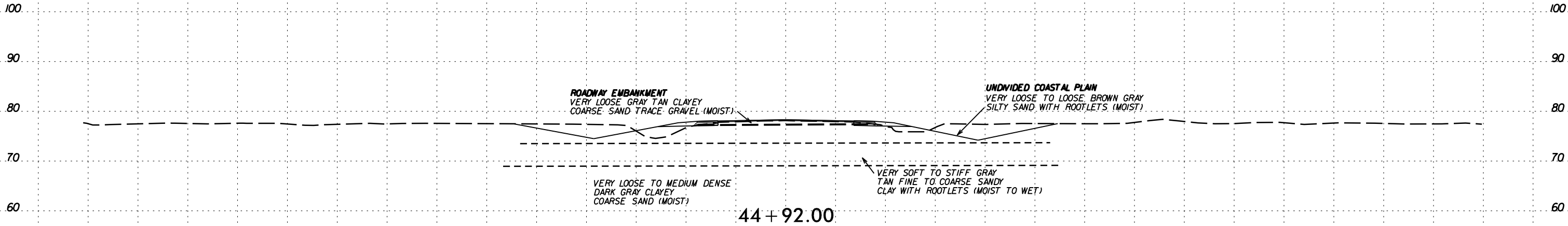
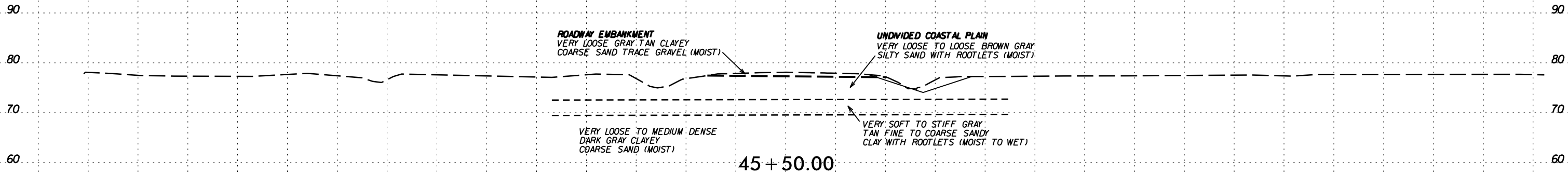
6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
107

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

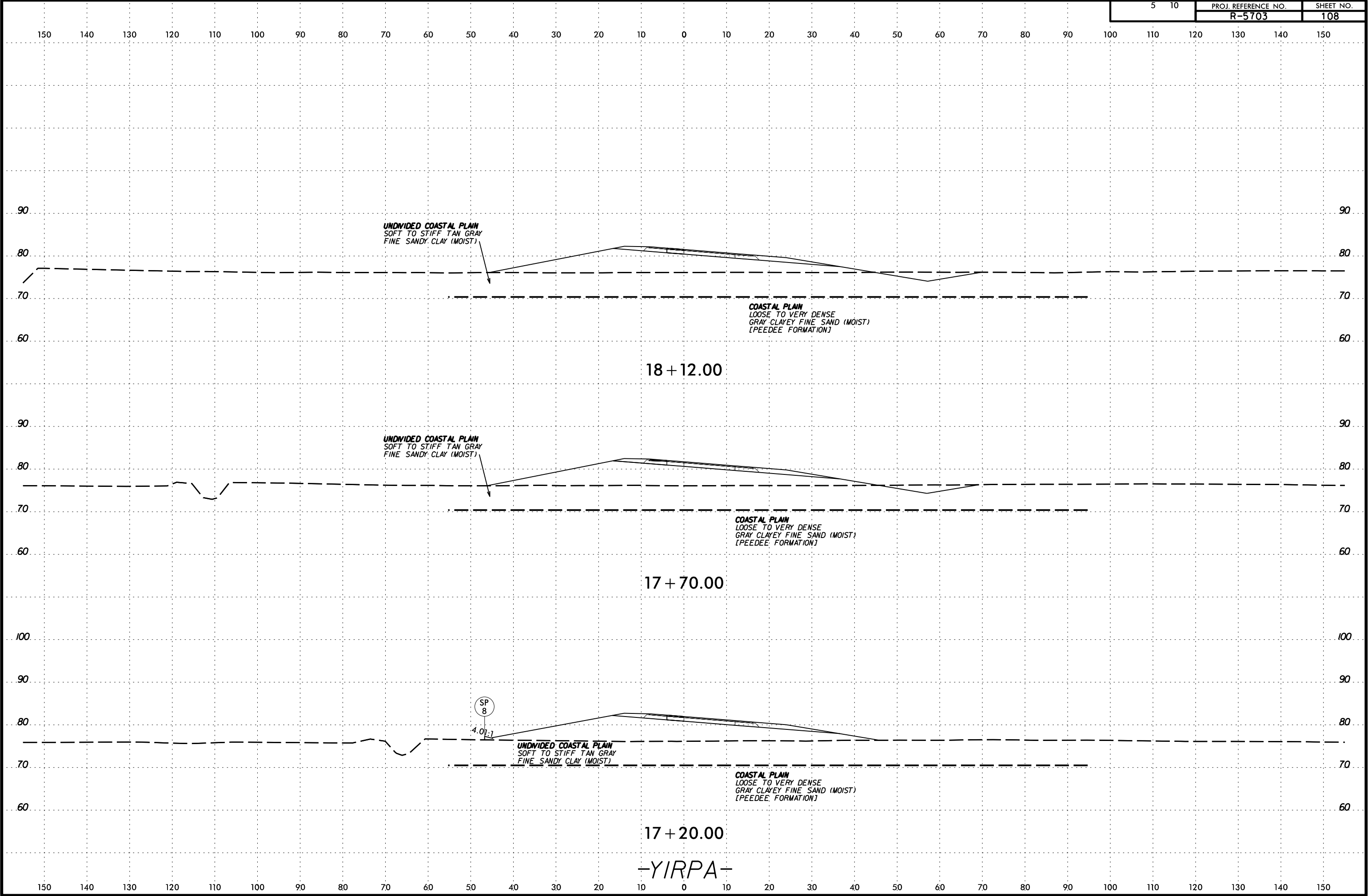


-Y/-

SECTION  
SURNAME

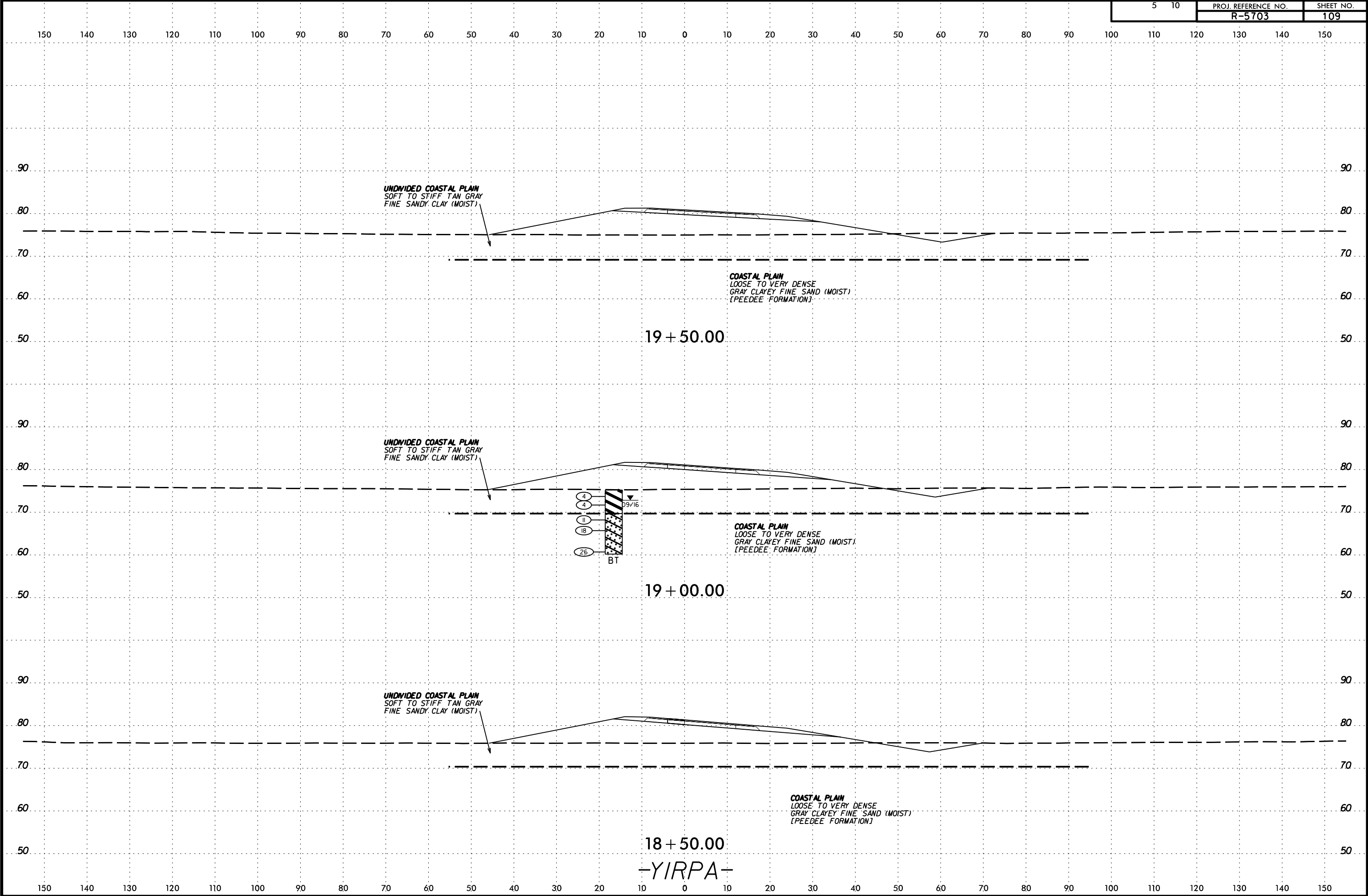
6/23/16

5	10	PROJ. REFERENCE NO.	SHEET NO.
		R-5703	108



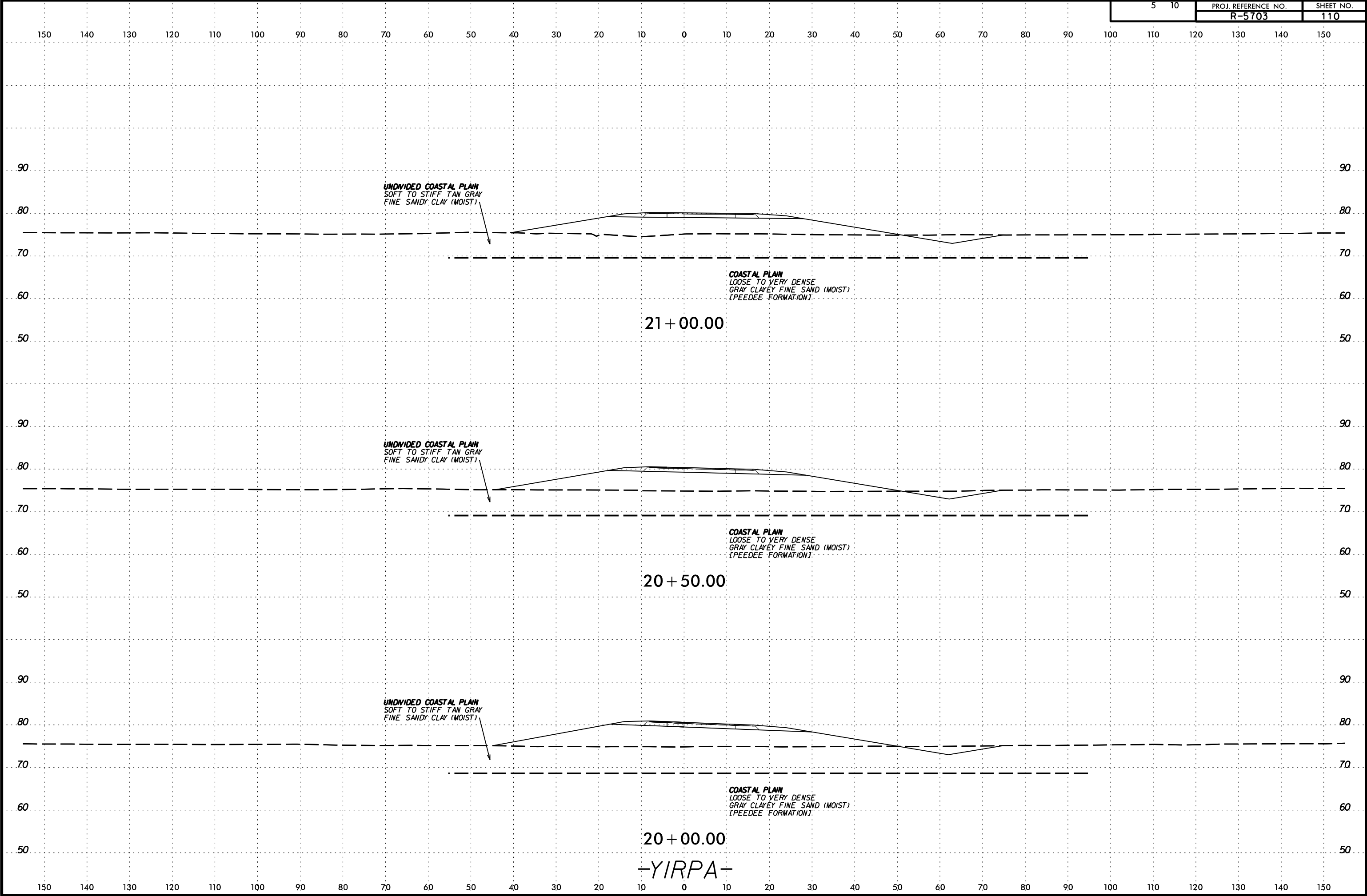
6/23/16

5	10	PROJ. REFERENCE NO.	SHEET NO.
		R-5703	109



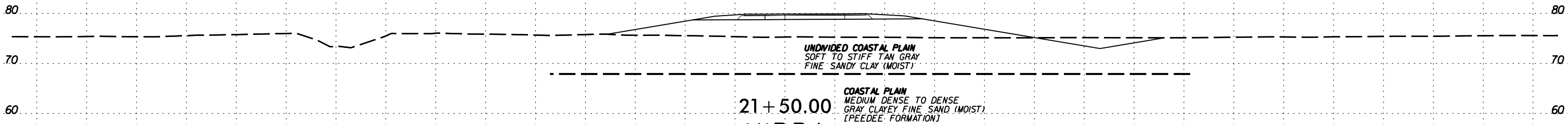
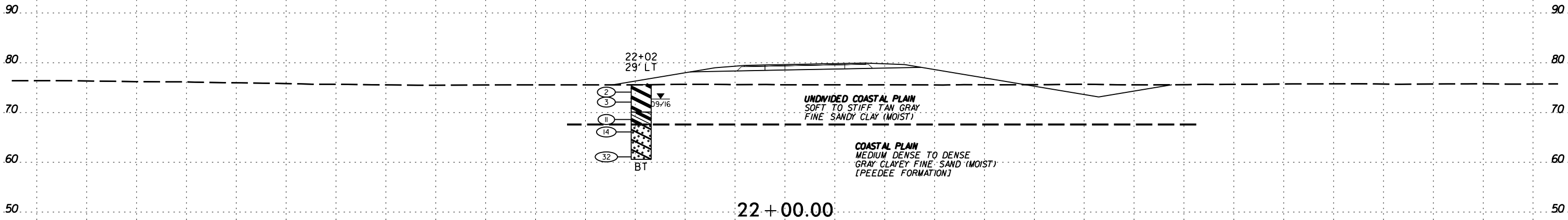
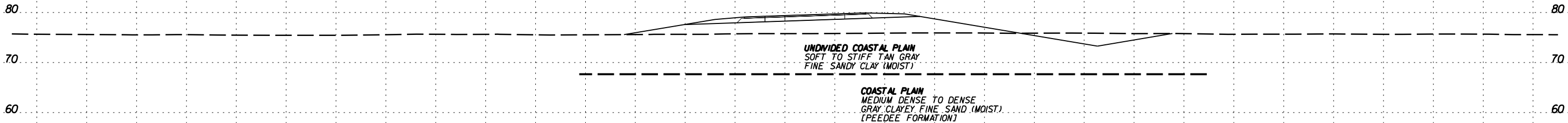
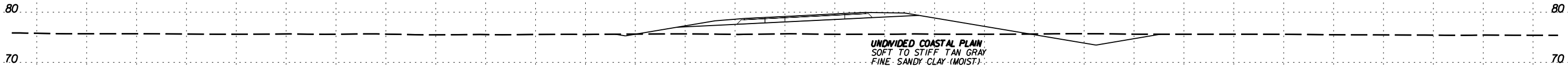
SECTION 18+50.00 TO 19+00.00  
SUBGRADE





6/23/16

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

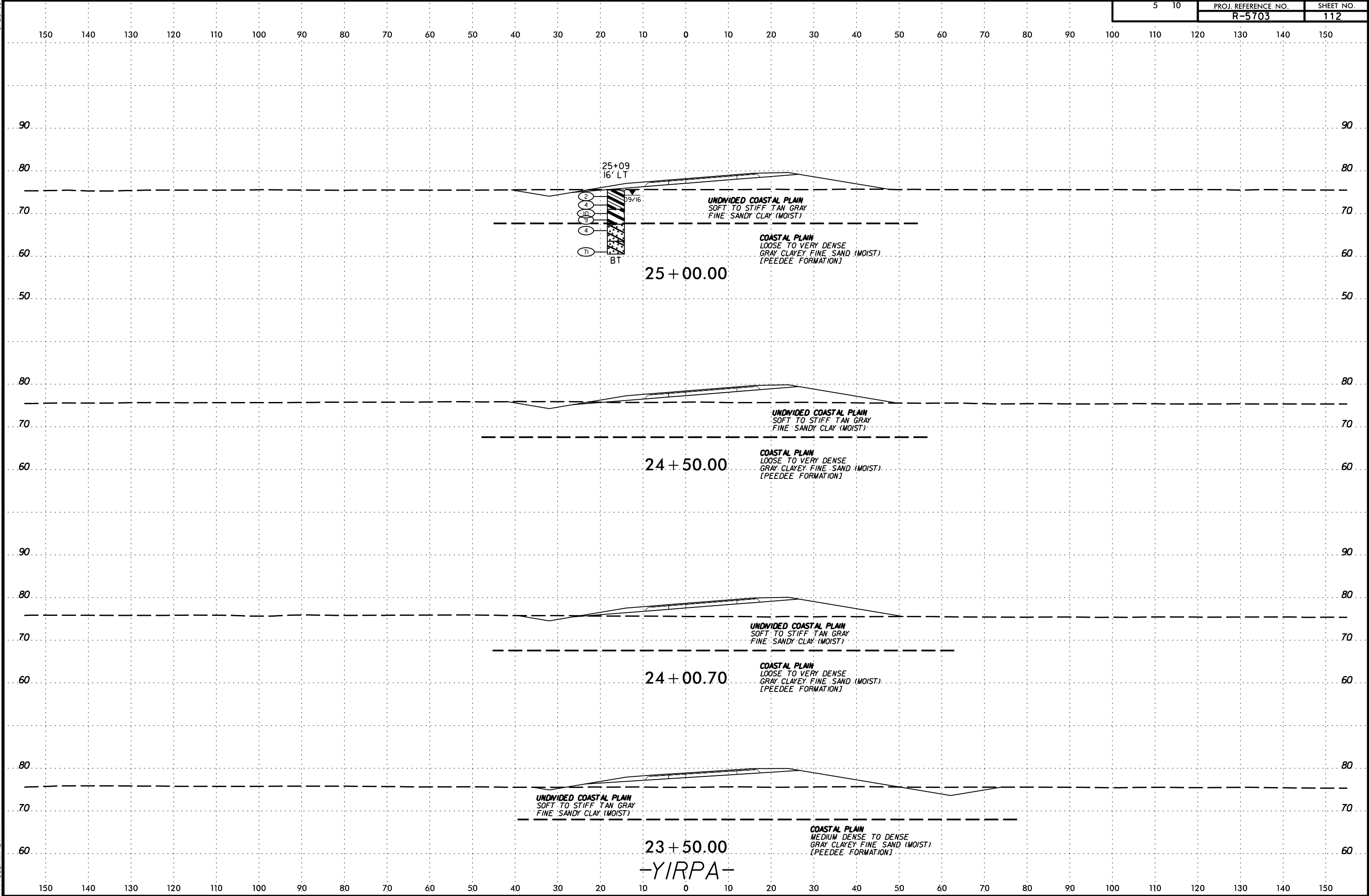


-YIRPA-

SYNTHETIC SECTION  
SURNAME

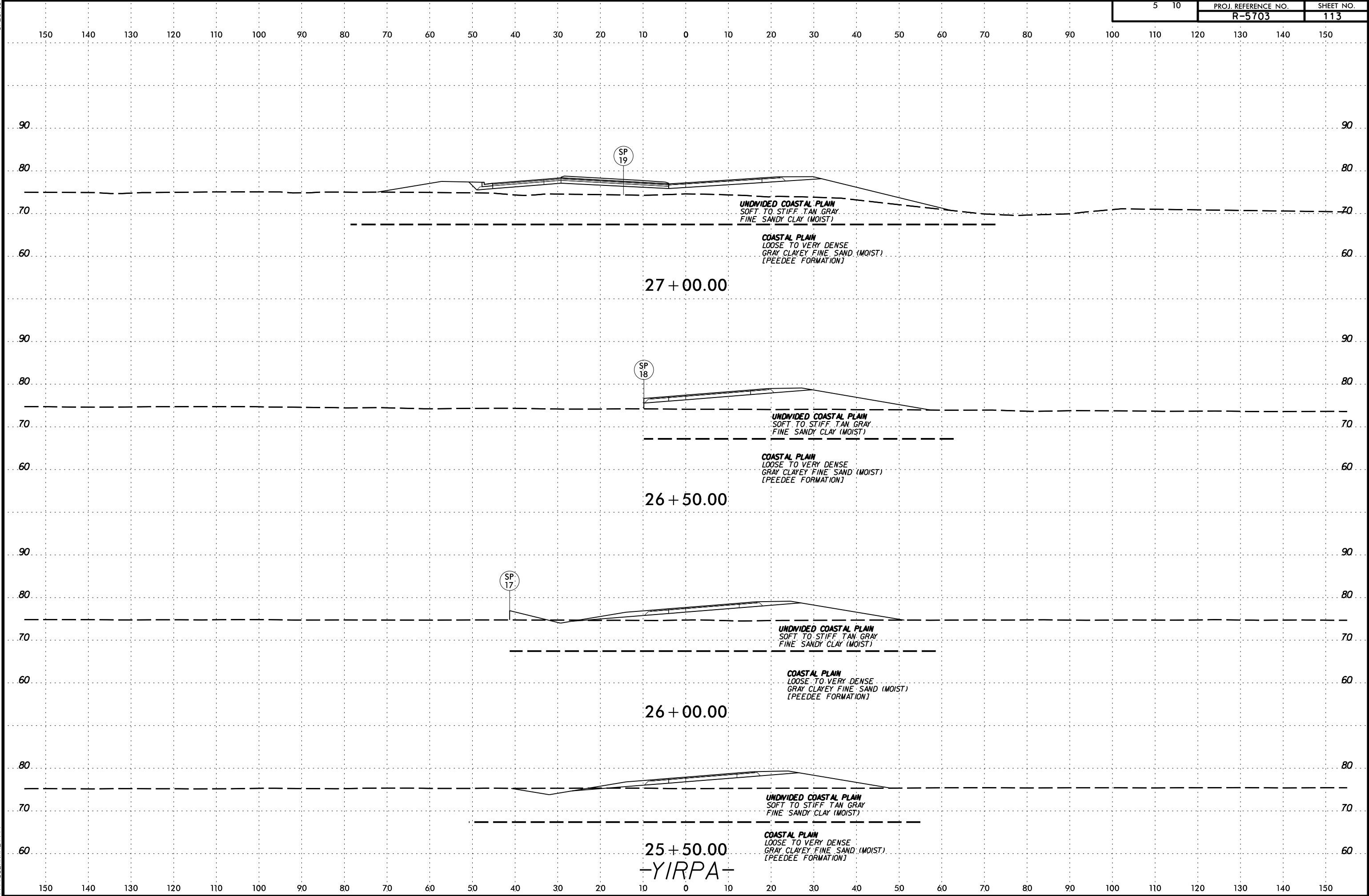
6/23/16

5	10	PROJ. REFERENCE NO.	SHEET NO.
		R-5703	112

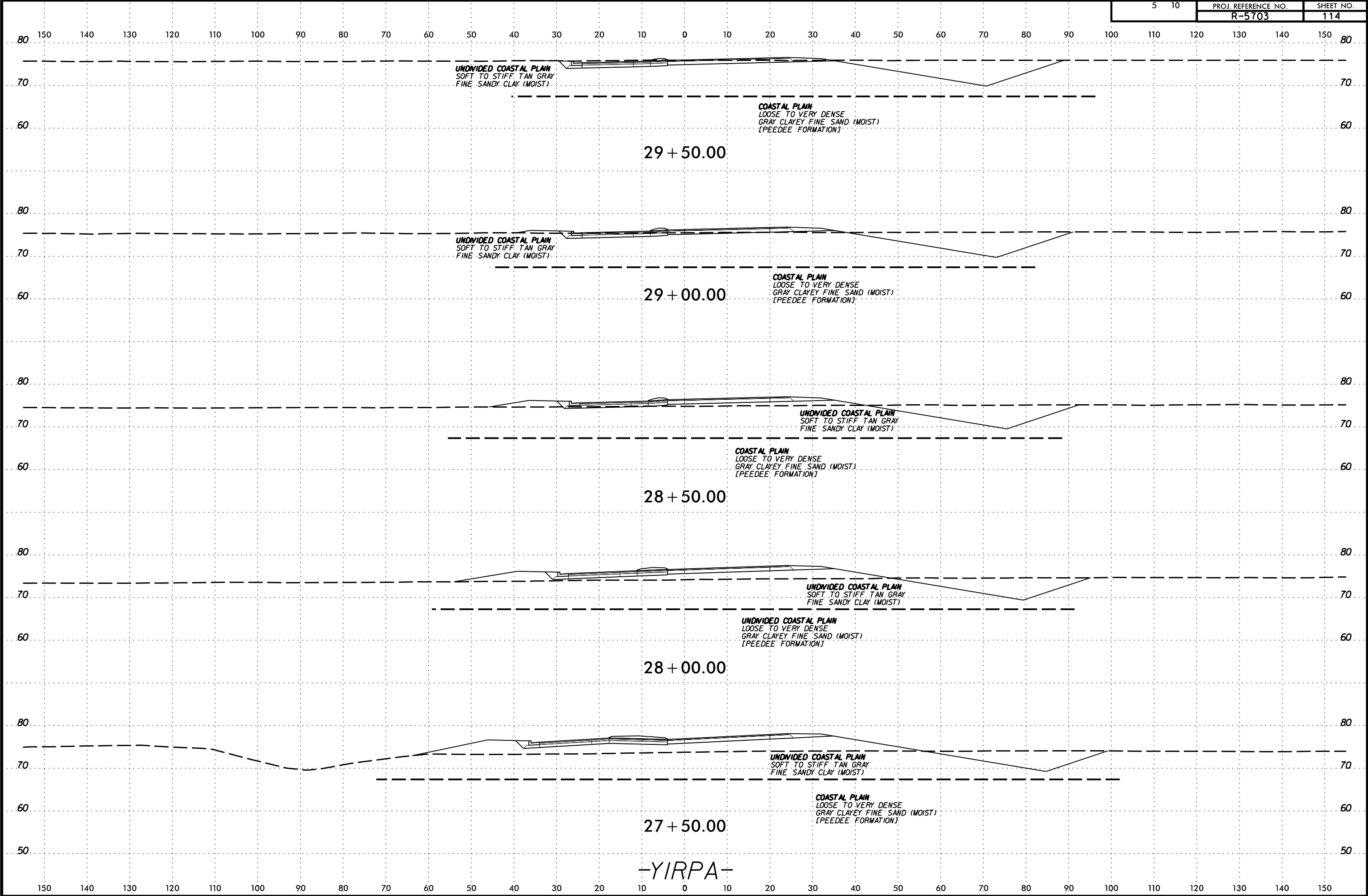


6/23/16

5	10	PROJ. REFERENCE NO.	SHEET NO.
		R-5703	113



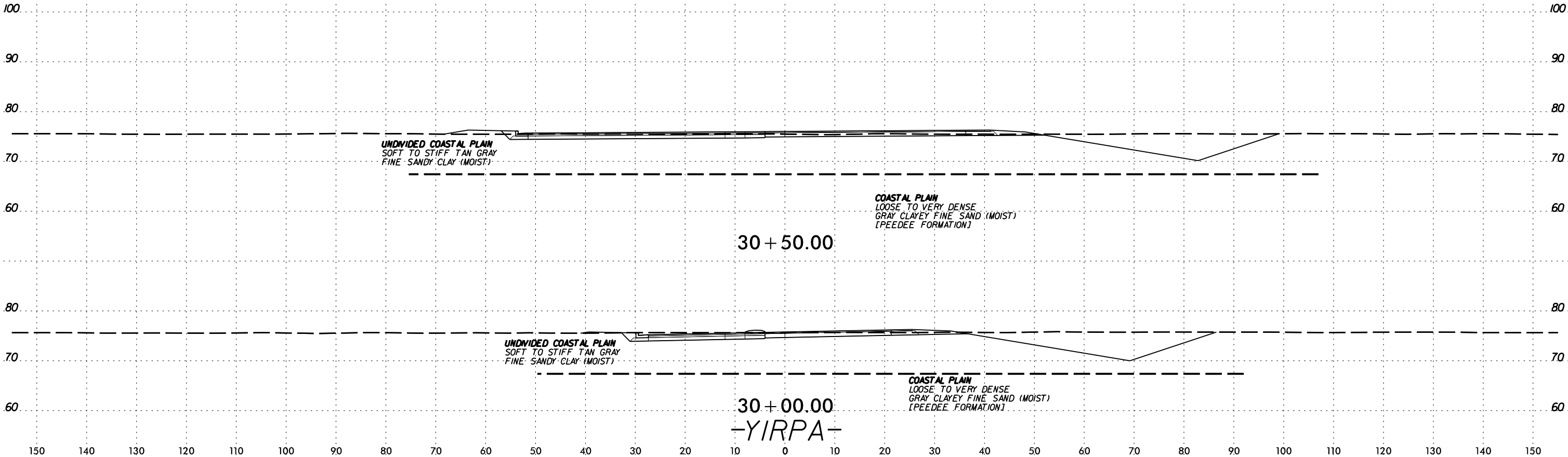
6/23/16

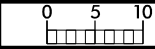


6/23/16

5	10	PROJ. REFERENCE NO.	SHEET NO.
		R-5703	115

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150





PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
116

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

90 90

80 80

70 70

60 60

50 50

90 90

80 80

70 70

60 60

50 50

90 90

80 80

70 70

60 60

UNDIVIDED COASTAL PLAIN  
SOFT TO MEDIUM STIFF ORANGE TAN  
FINE SANDY CLAY (MOIST TO WET)

LOOSE TO MEDIUM DENSE GRAY  
CLAYEY FINE SAND WITH TRACE MICA  
(MOIST TO WET)

20 + 36.00

UNDIVIDED COASTAL PLAIN  
SOFT TO MEDIUM STIFF ORANGE TAN  
FINE SANDY CLAY (MOIST TO WET)

LOOSE TO MEDIUM DENSE GRAY  
CLAYEY FINE SAND WITH TRACE MICA  
(MOIST TO WET)

19 + 86.00

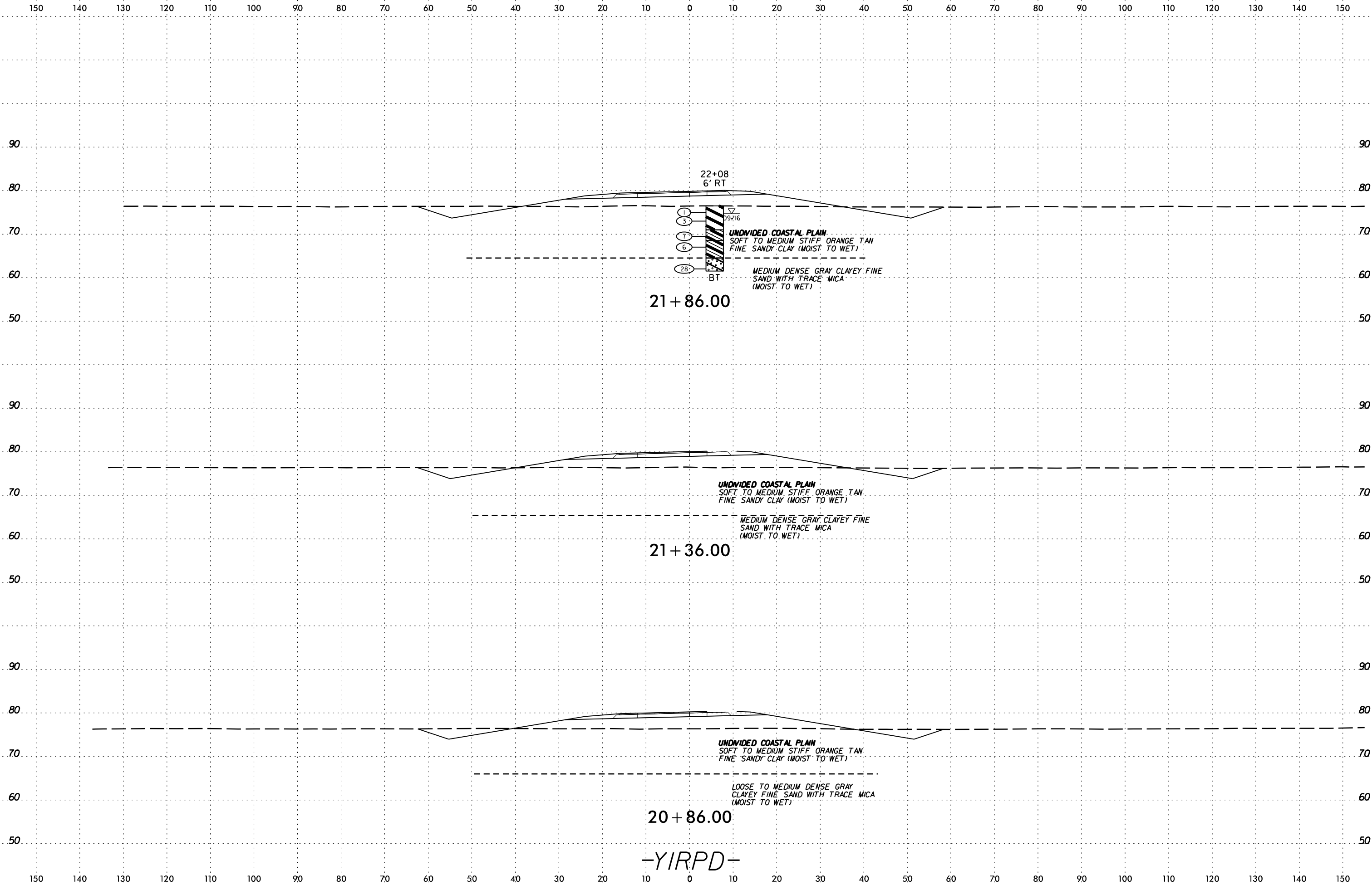
UNDIVIDED COASTAL PLAIN  
SOFT TO MEDIUM STIFF ORANGE TAN  
FINE SANDY CLAY (MOIST TO WET)

LOOSE TO MEDIUM DENSE GRAY  
CLAYEY FINE SAND WITH TRACE MICA  
(MOIST TO WET)

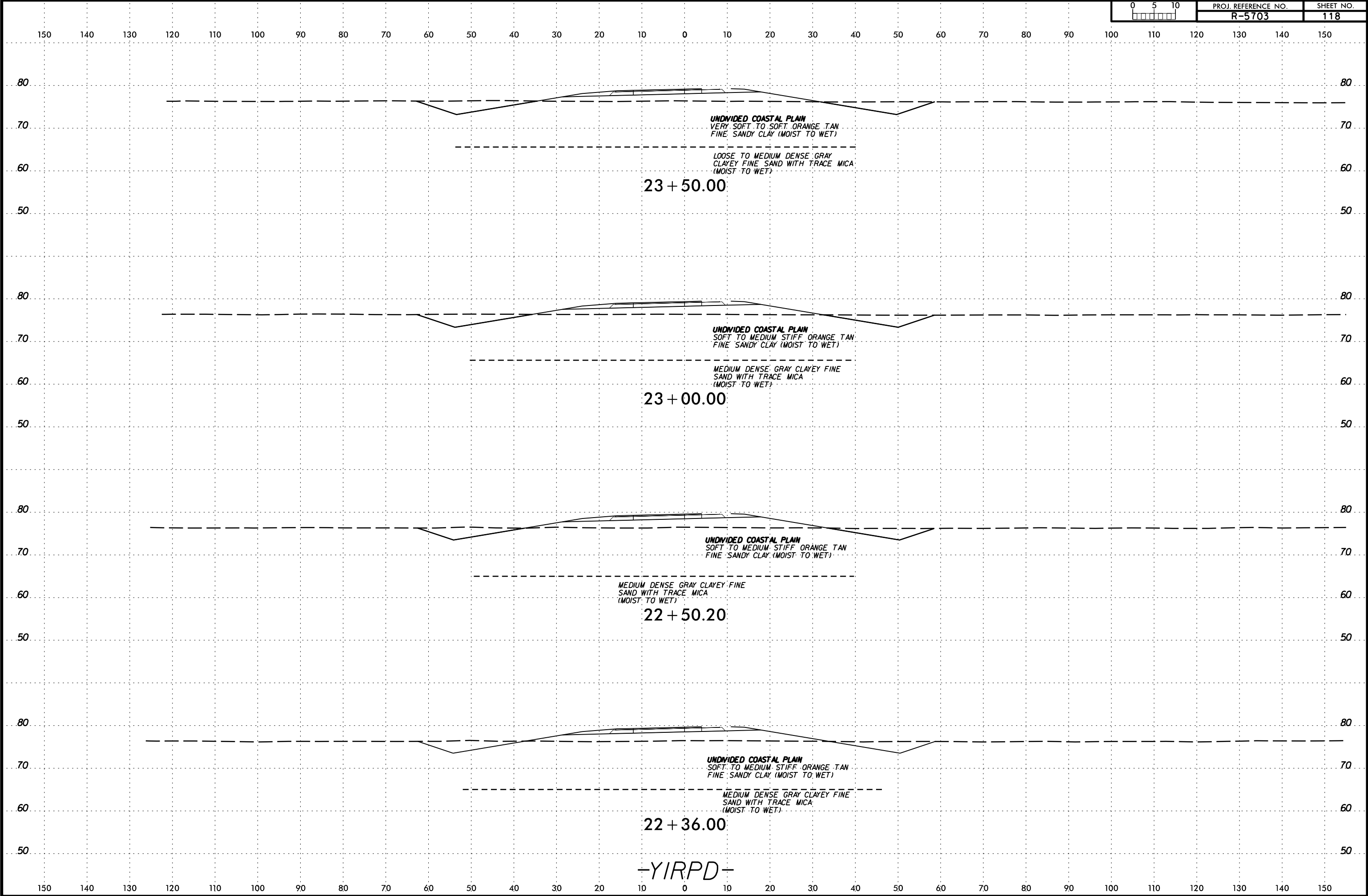
19 + 36.00

-YIRPD-

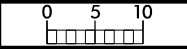
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



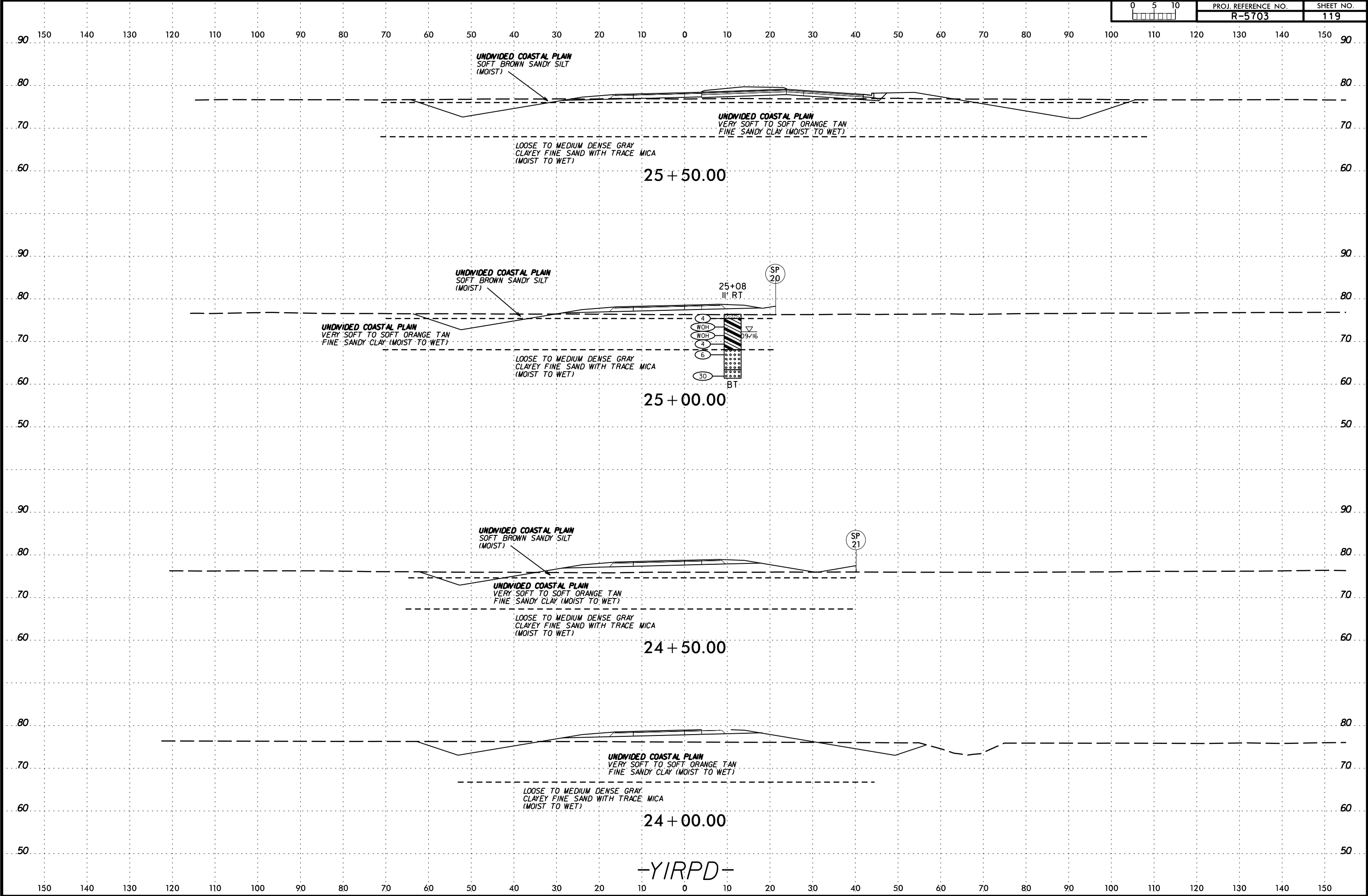




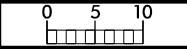
6/23/16



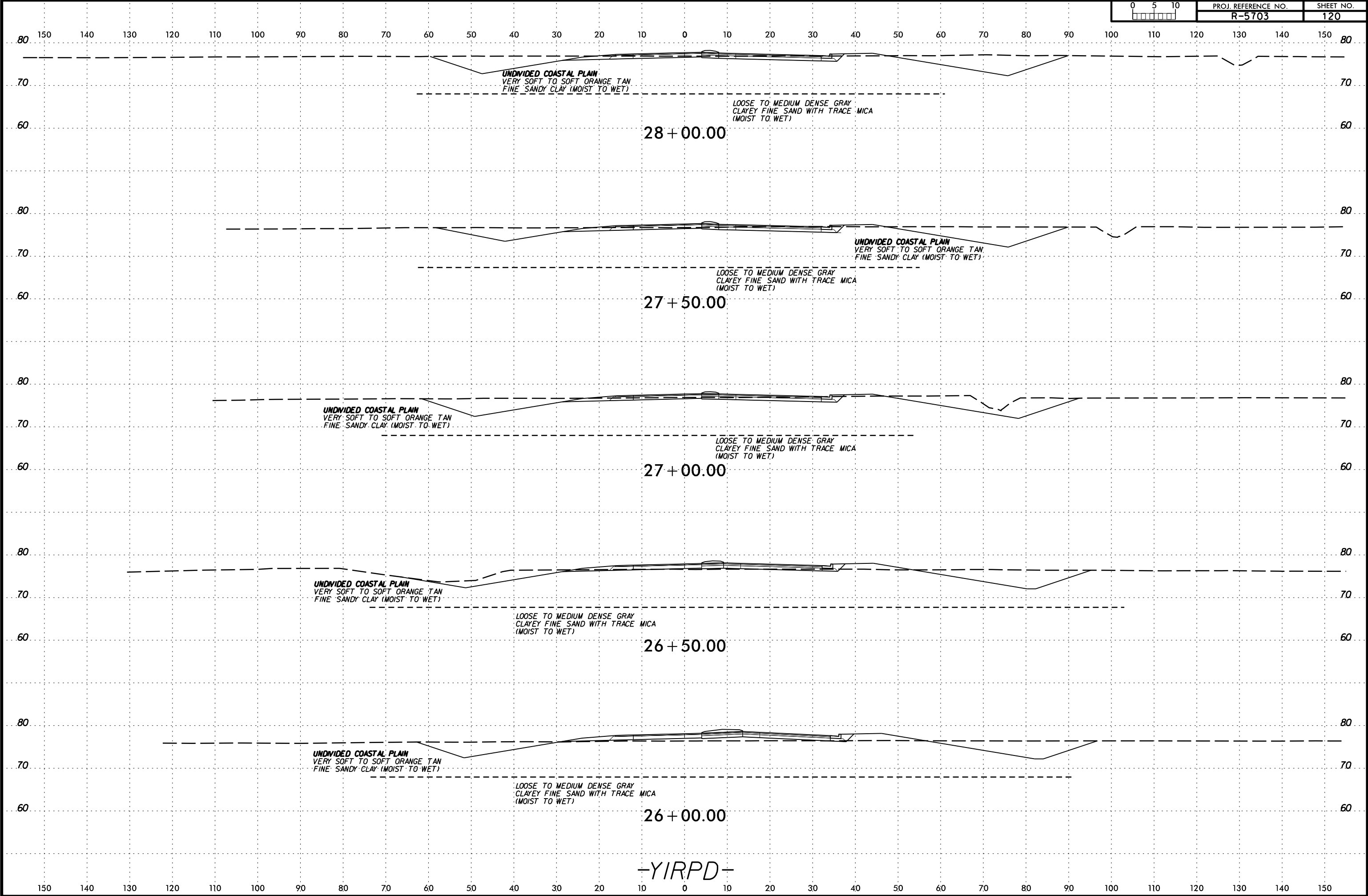
PROJ. REFERENCE NO.	SHEET NO.
R-5703	119



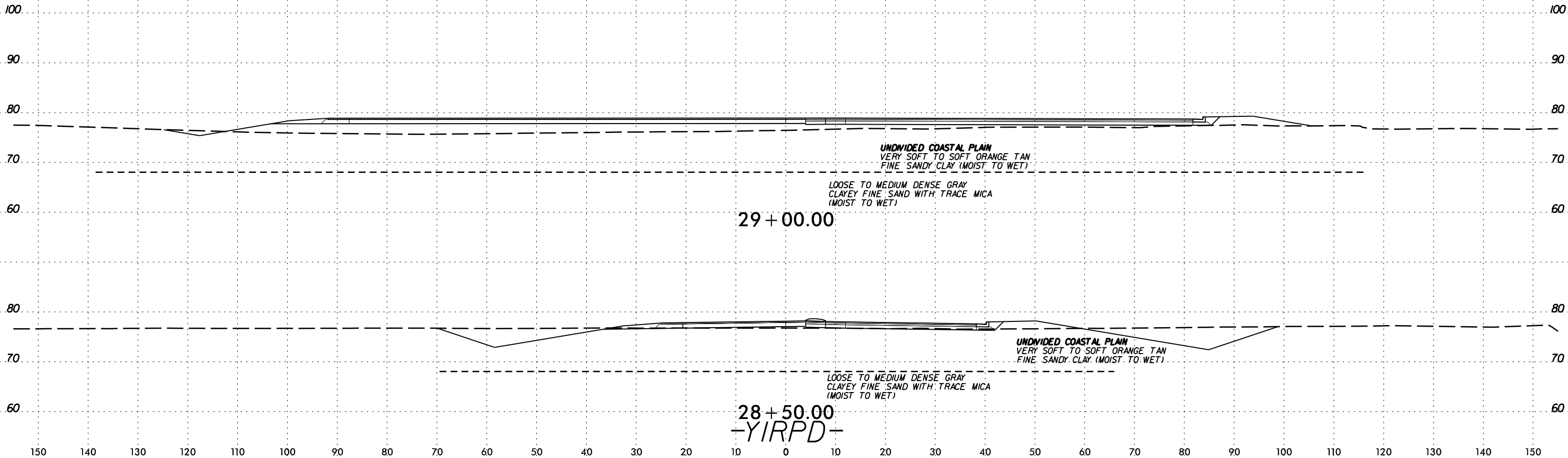
6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	120



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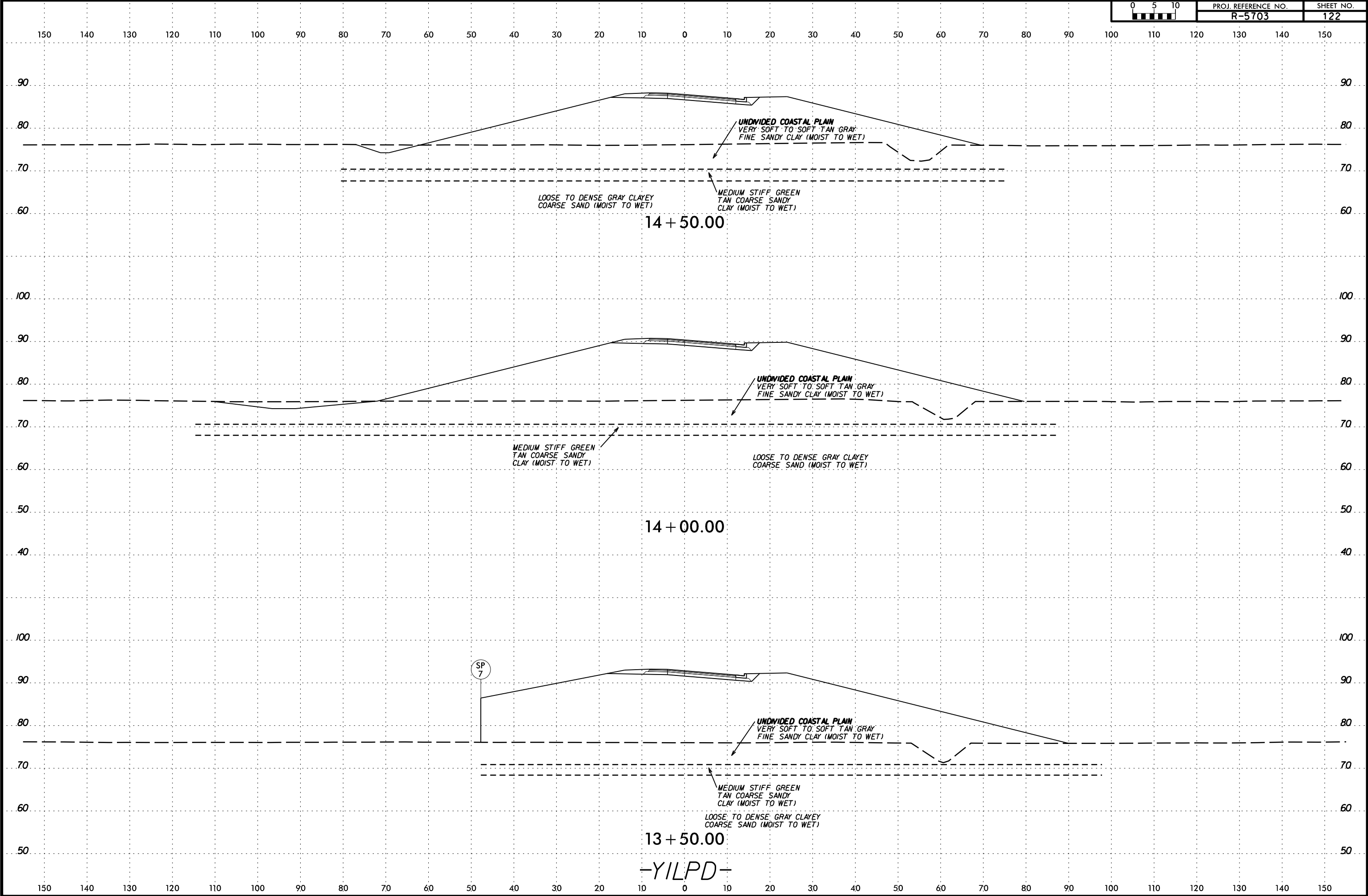


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
122



6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	123

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

110

100

90

80

70

60

50

90

80

70

60

100

90

80

70

60

110

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70

60

50

90

80

70

60

100

90

80

70

60

# SOIL TEST RESULTS

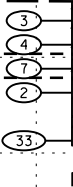
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-83	16' RT	15+96	2.5 - 4.0	A-7-6 (18)	54	34	13	29	9	49	99	92	86	61.5	30.3	ND

UNDIVIDED COASTAL PLAIN  
SOFT TAN GRAY FINE  
SANDY CLAY (MOIST TO WET)

SS-83  
15+96  
16' RT

MEDIUM STIFF GREEN TAN COARSE  
SANDY CLAY (MOIST TO WET)

VERY LOOSE TO DENSE GRAY CLAYEY  
COARSE SAND (MOIST TO WET)



16+00.00

UNDIVIDED COASTAL PLAIN  
SOFT TAN GRAY FINE  
SANDY CLAY (MOIST TO WET)

VERY LOOSE TO DENSE GRAY CLAYEY  
COARSE SAND (MOIST TO WET)

MEDIUM STIFF GREEN TAN COARSE  
SANDY CLAY (MOIST TO WET)

15+50.00

UNDIVIDED COASTAL PLAIN  
SOFT TAN GRAY FINE  
SANDY CLAY (MOIST TO WET)

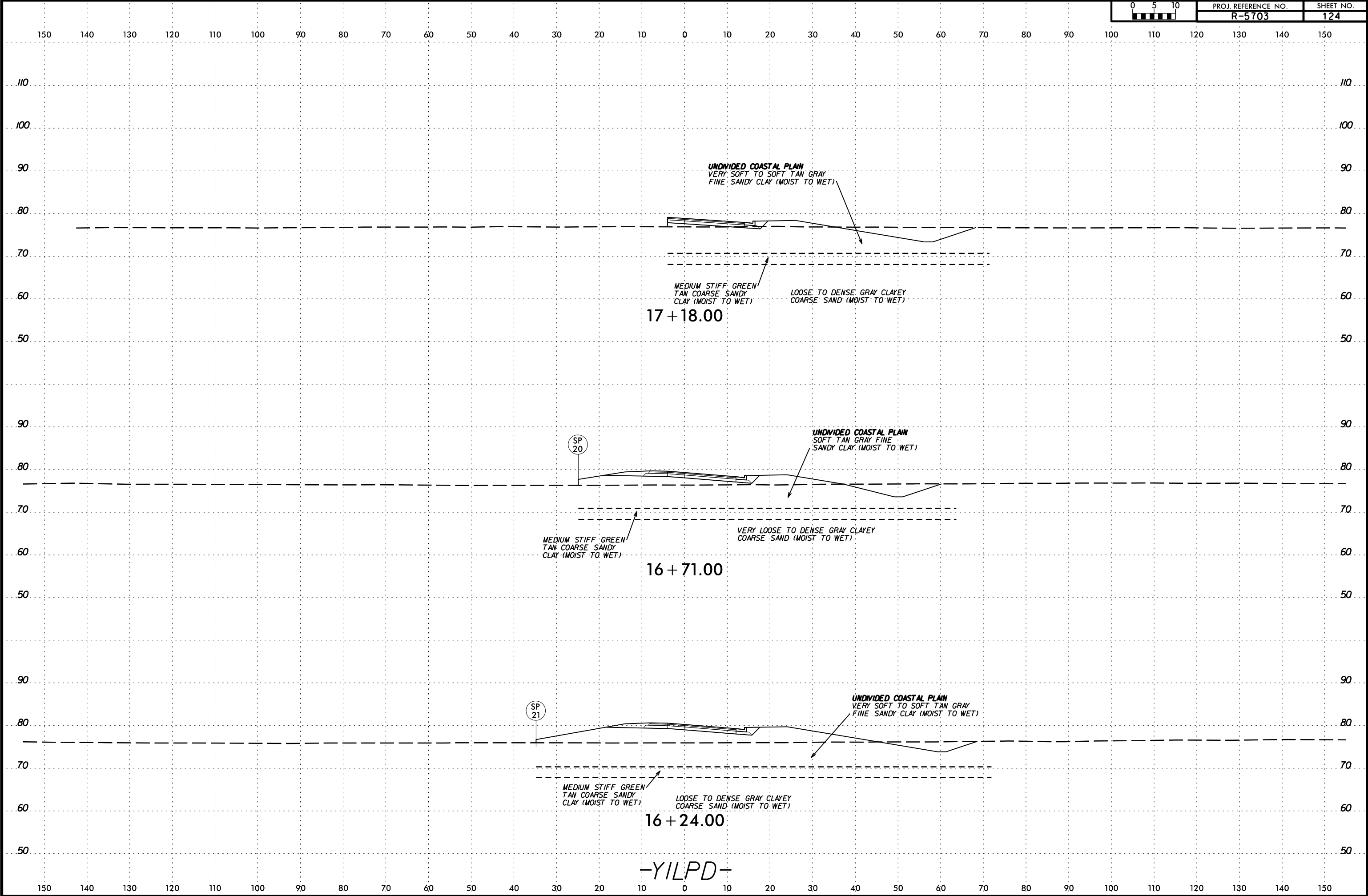
VERY LOOSE TO DENSE GRAY CLAYEY  
COARSE SAND (MOIST TO WET)

MEDIUM STIFF GREEN TAN COARSE  
SANDY CLAY (MOIST TO WET)

15+00.00

-YILPD-

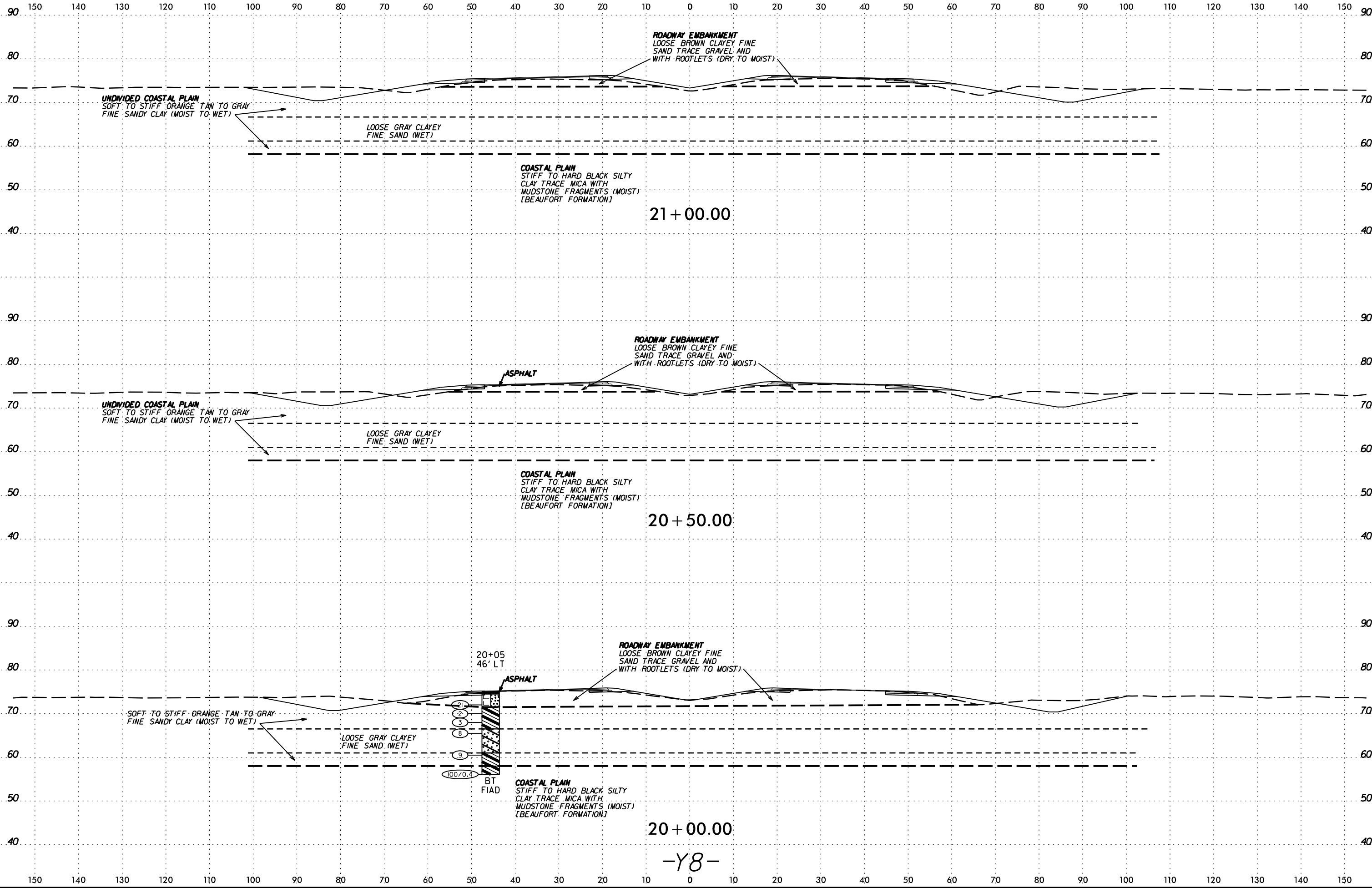
SYTIME  
CON  
SUPERNAME



6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	125

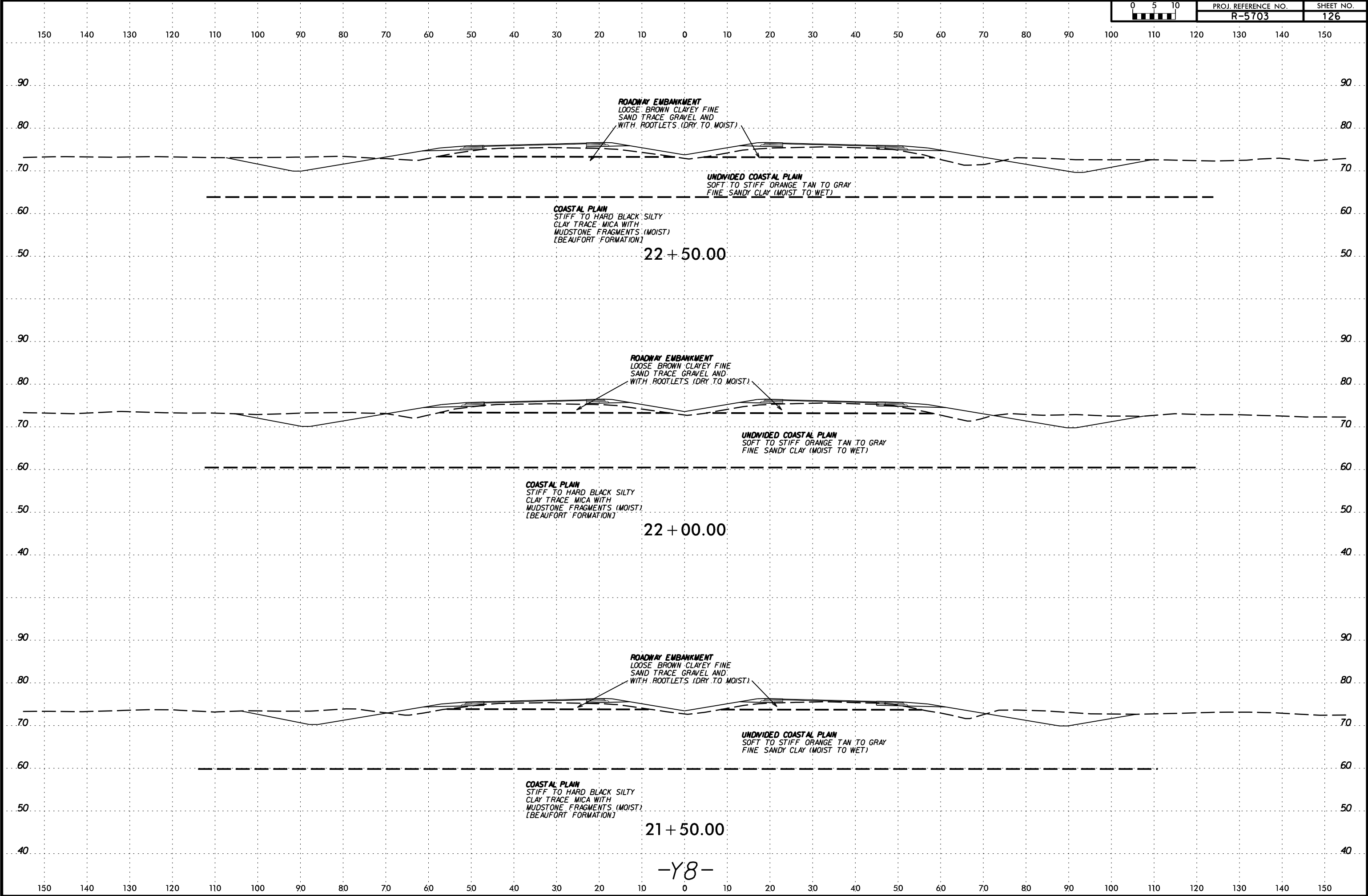




6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	126

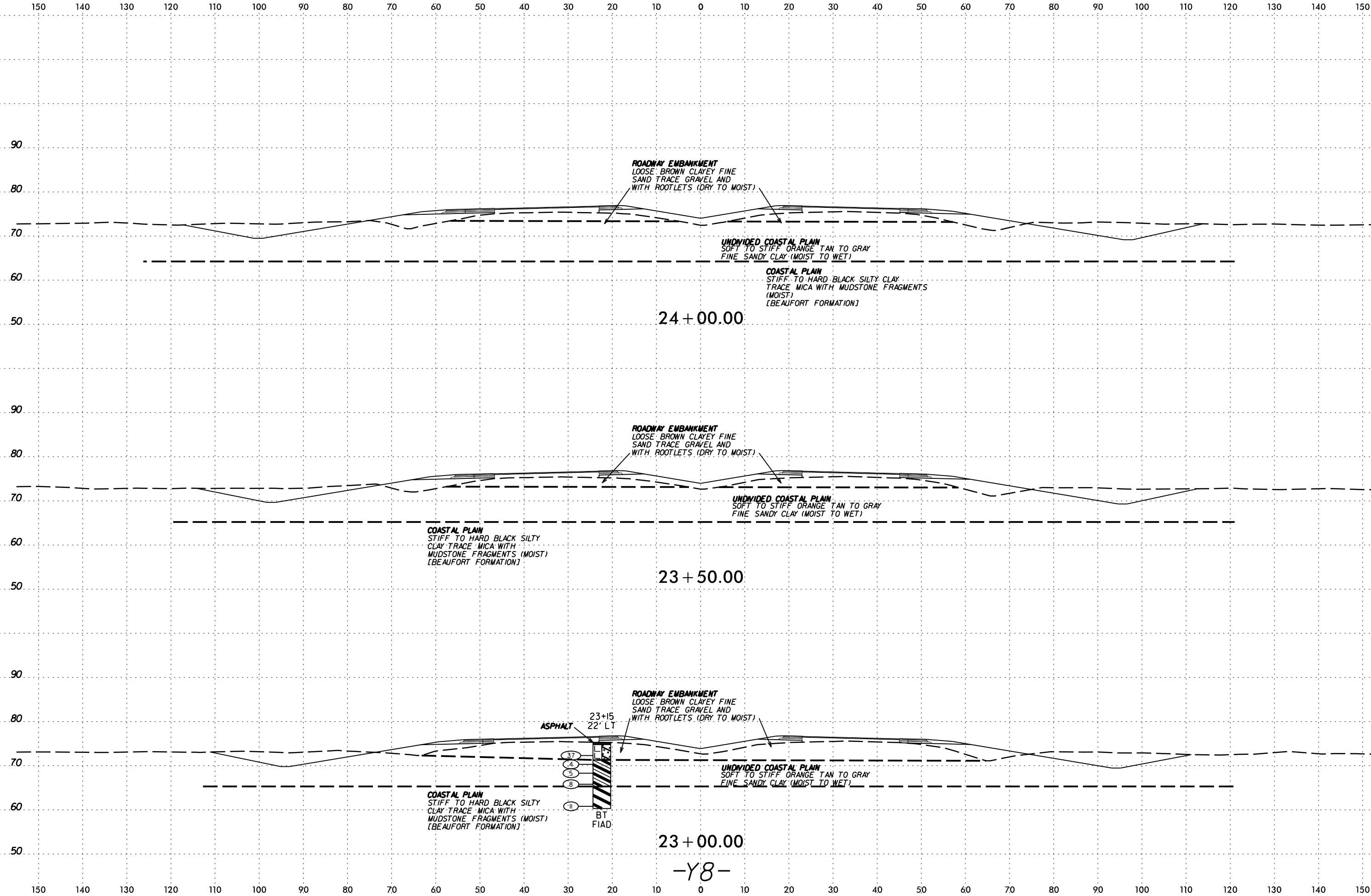


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
127

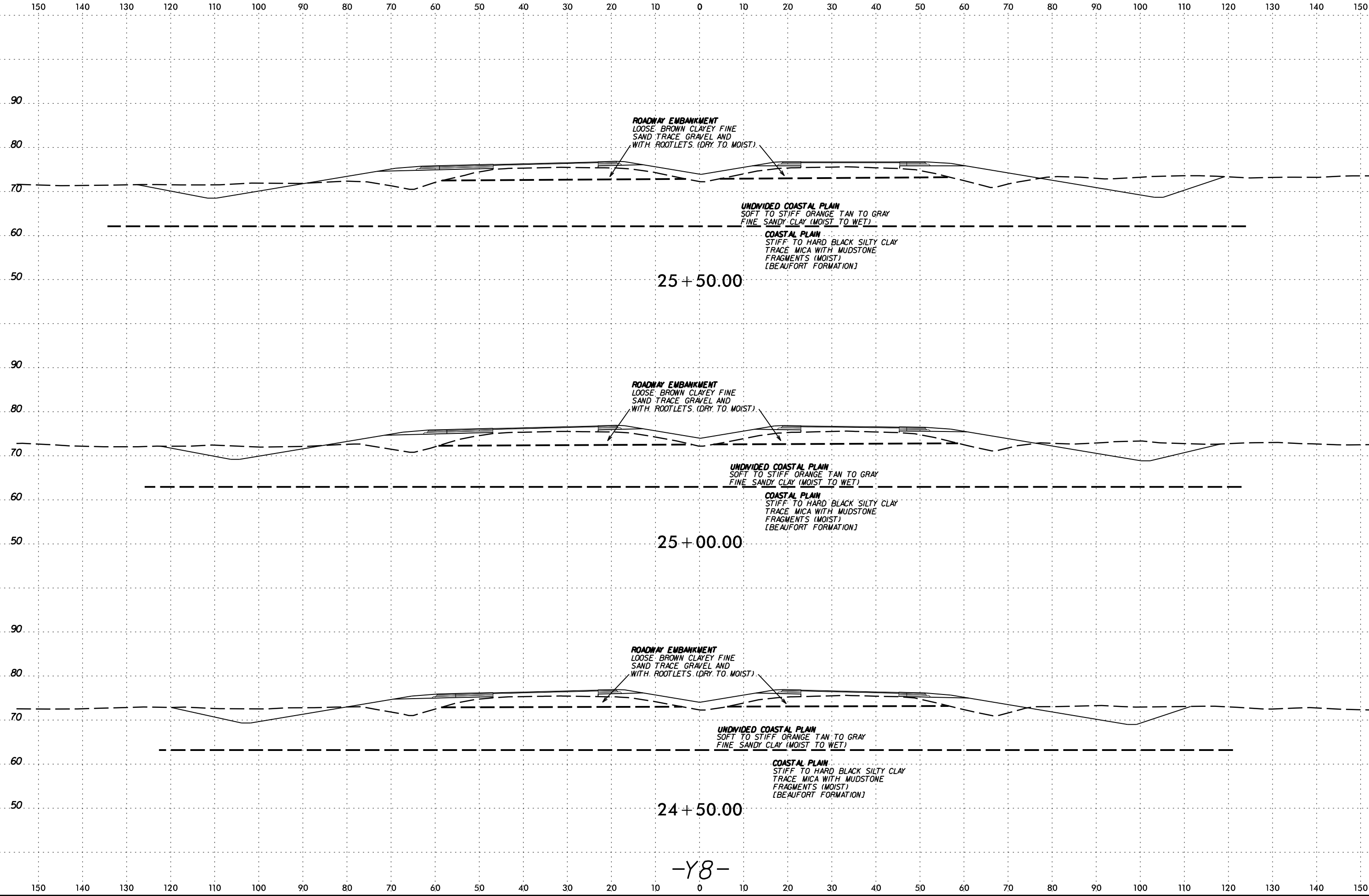


6/23/16



PROJ. REFERENCE NO.  
R-5703

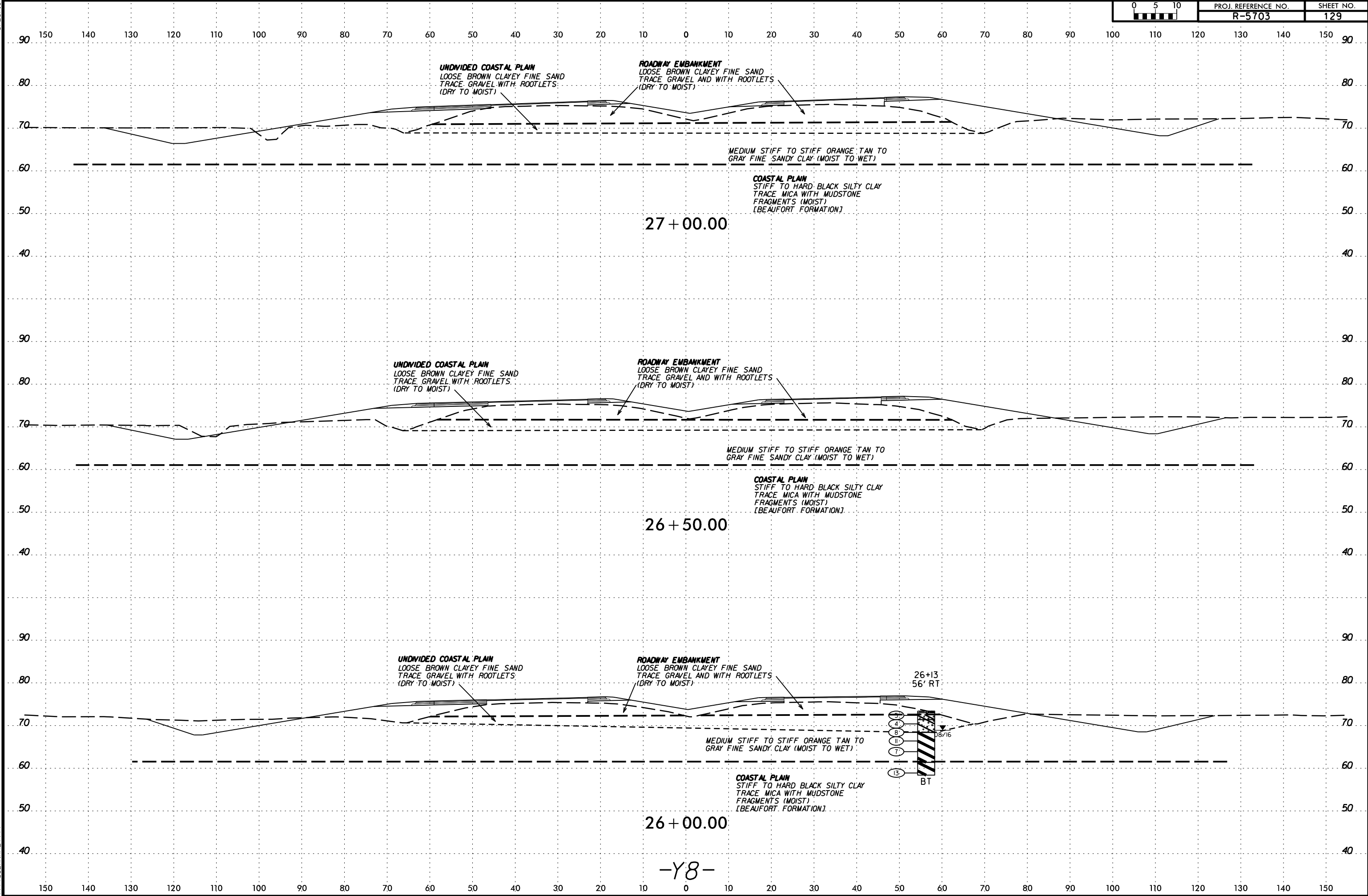
SHEET NO.  
128



6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	129

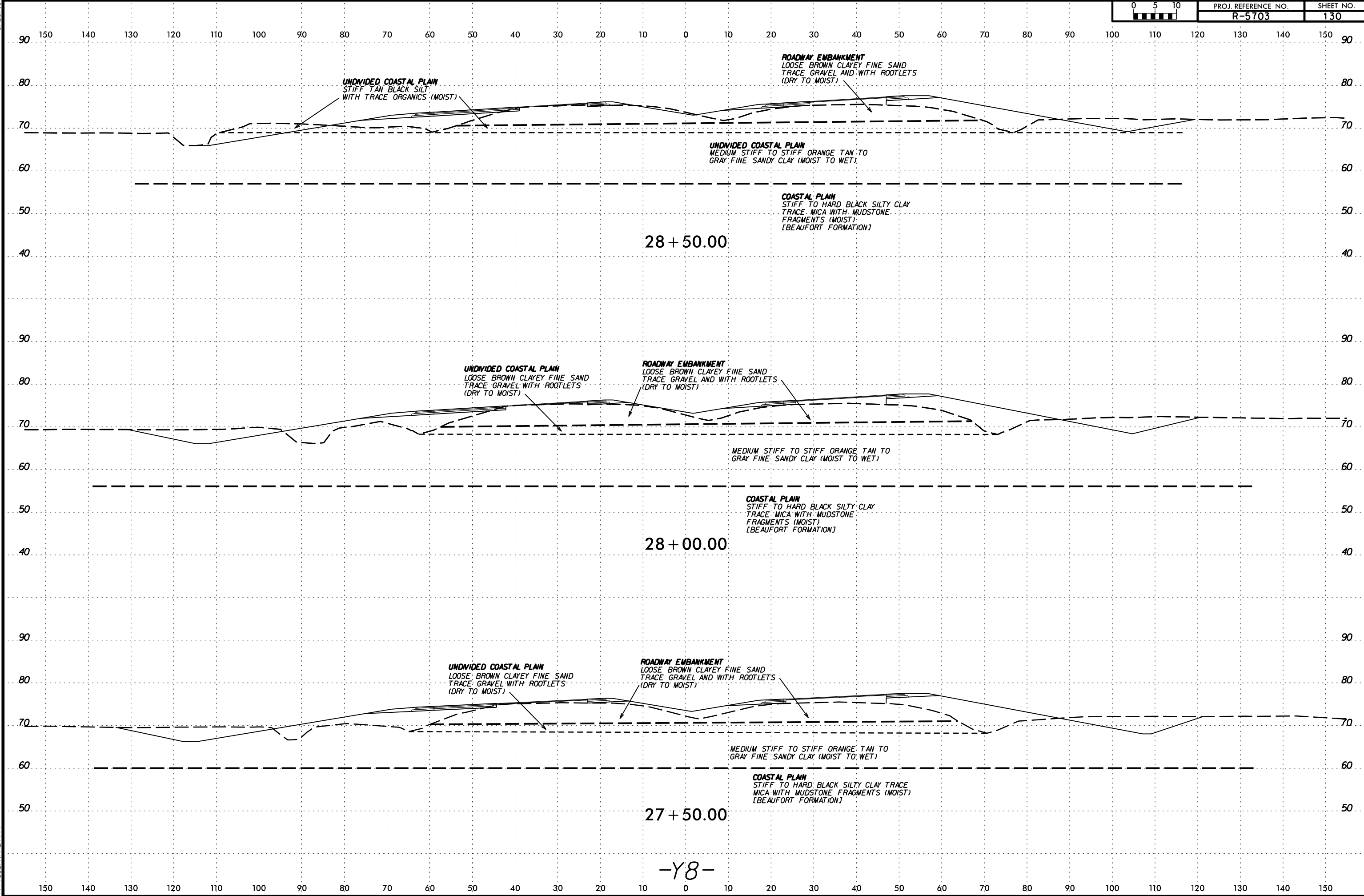


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
130



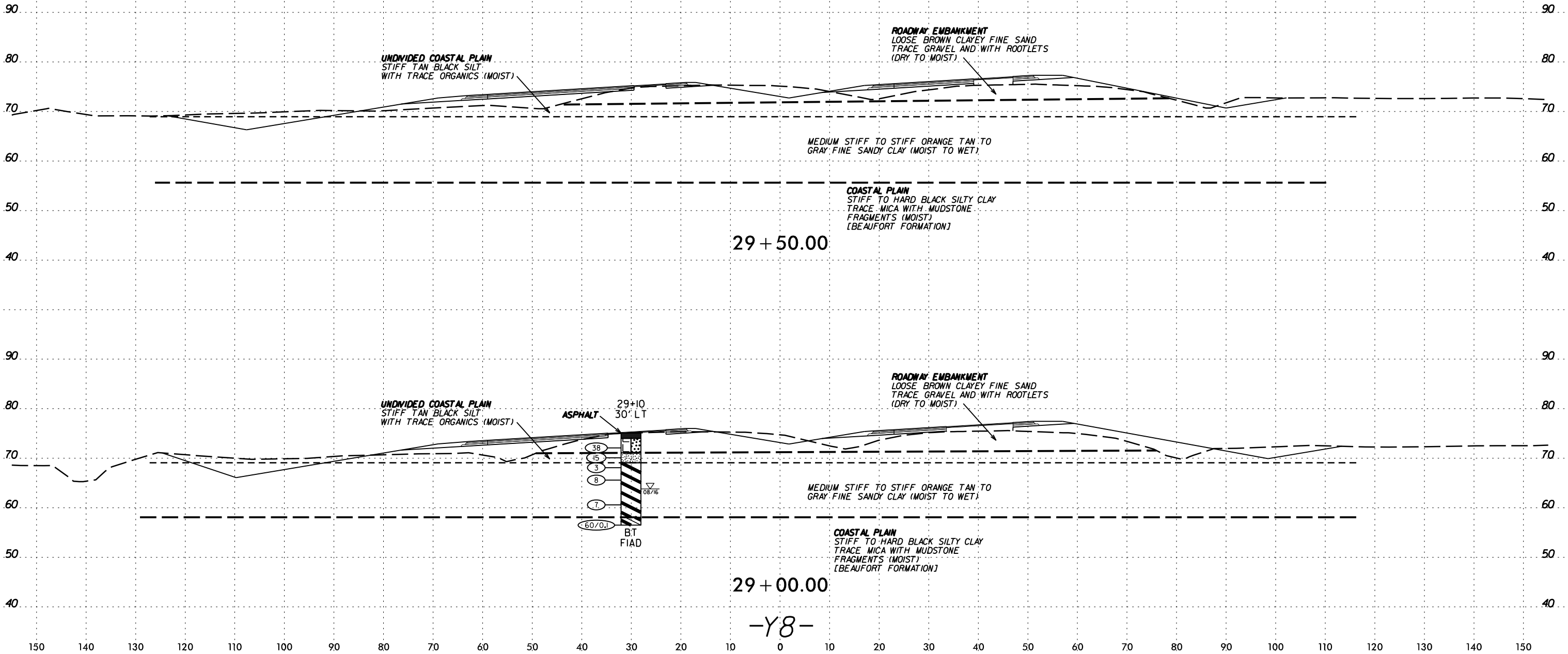
6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
131

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



29 + 50.00

29 + 00.00

-Y8-

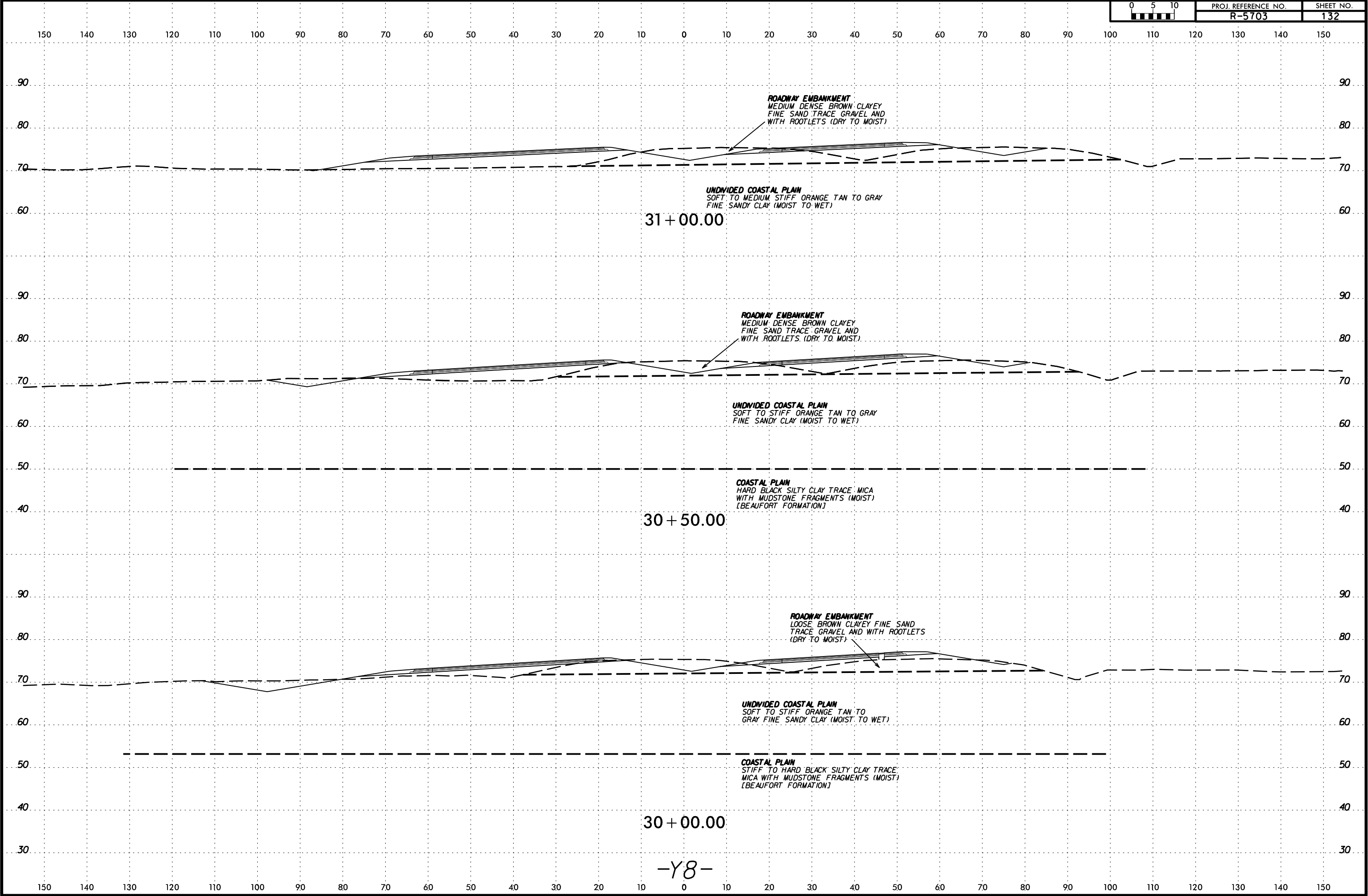
SYNOPSIS OF SOILS  
SUPERNAME

6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
132

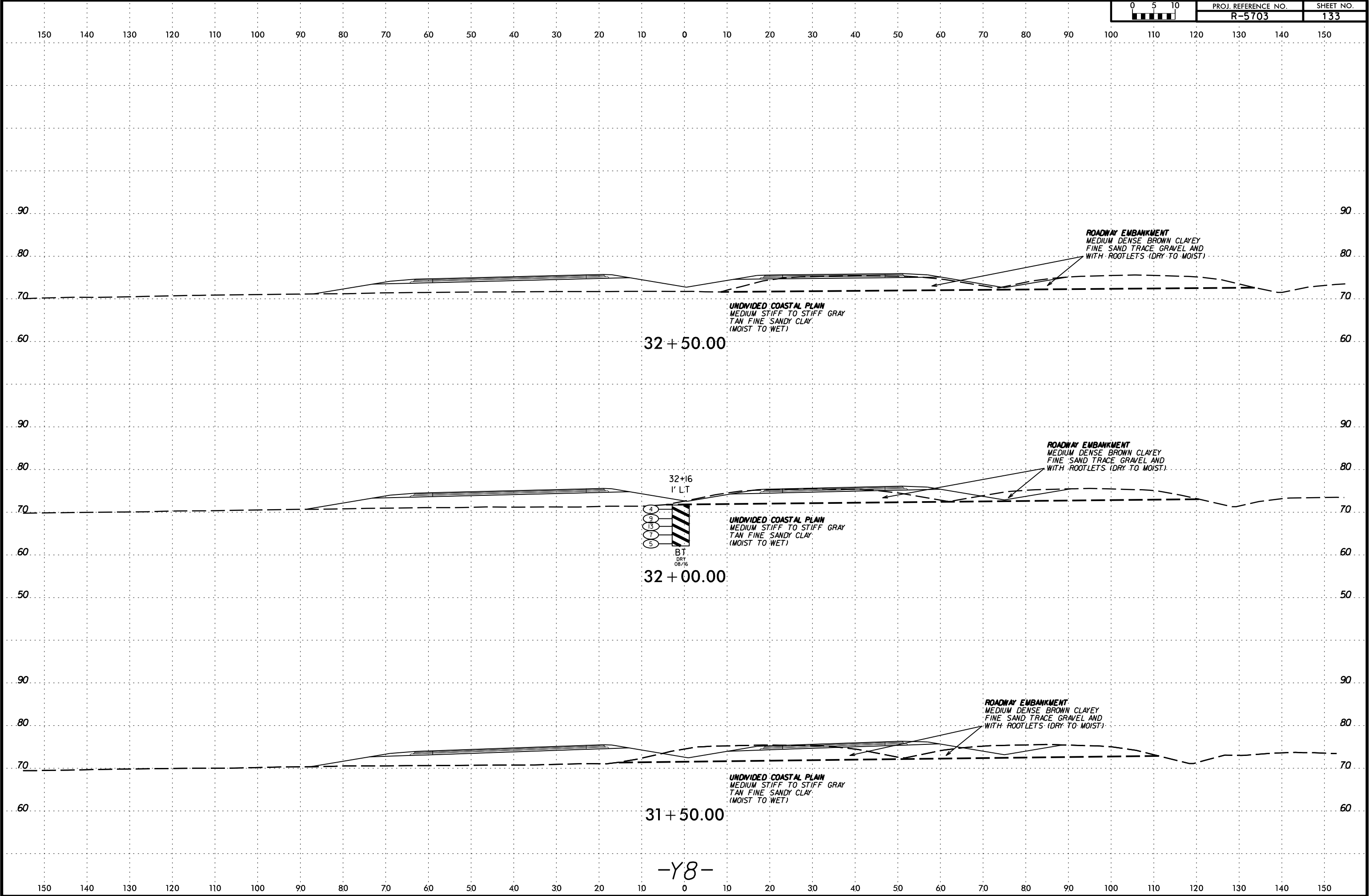


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
133





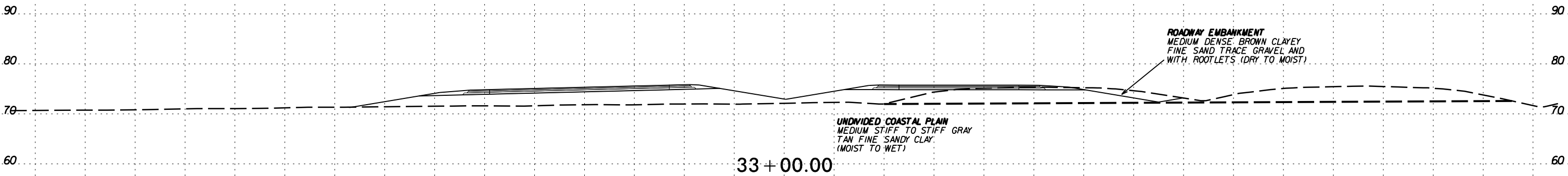
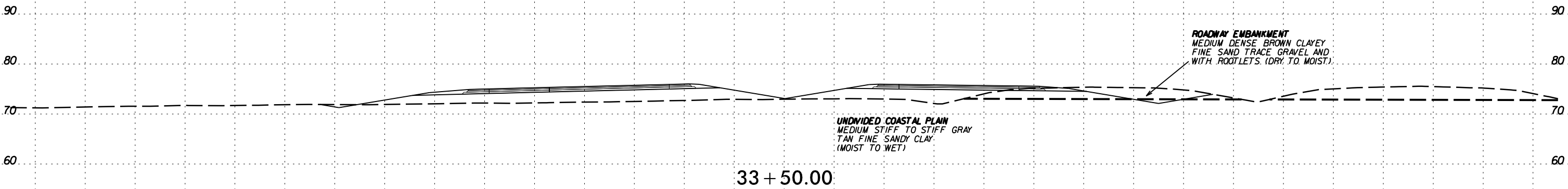
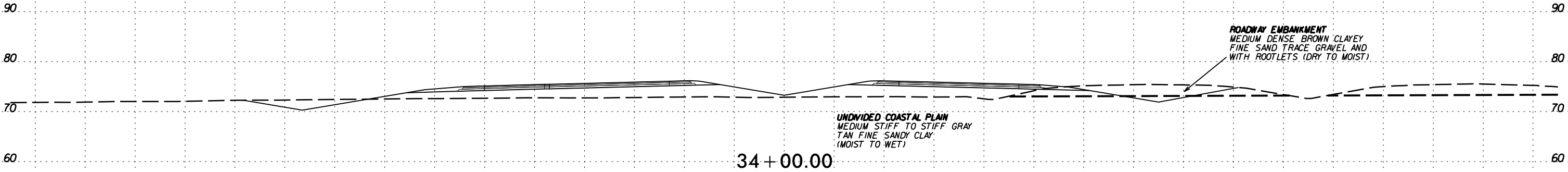
6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
134

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



-Y8-

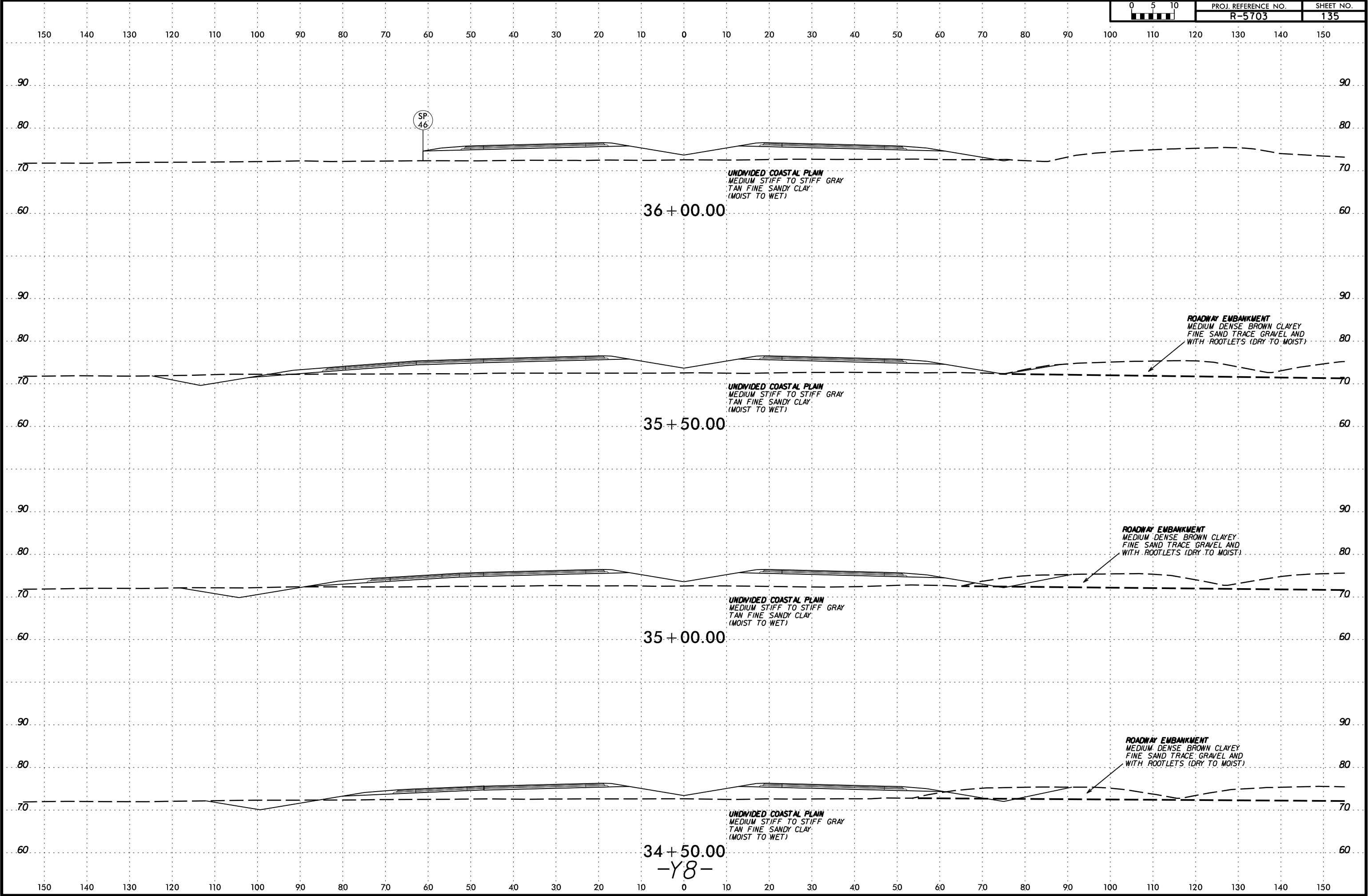
SECTION  
SURNAME

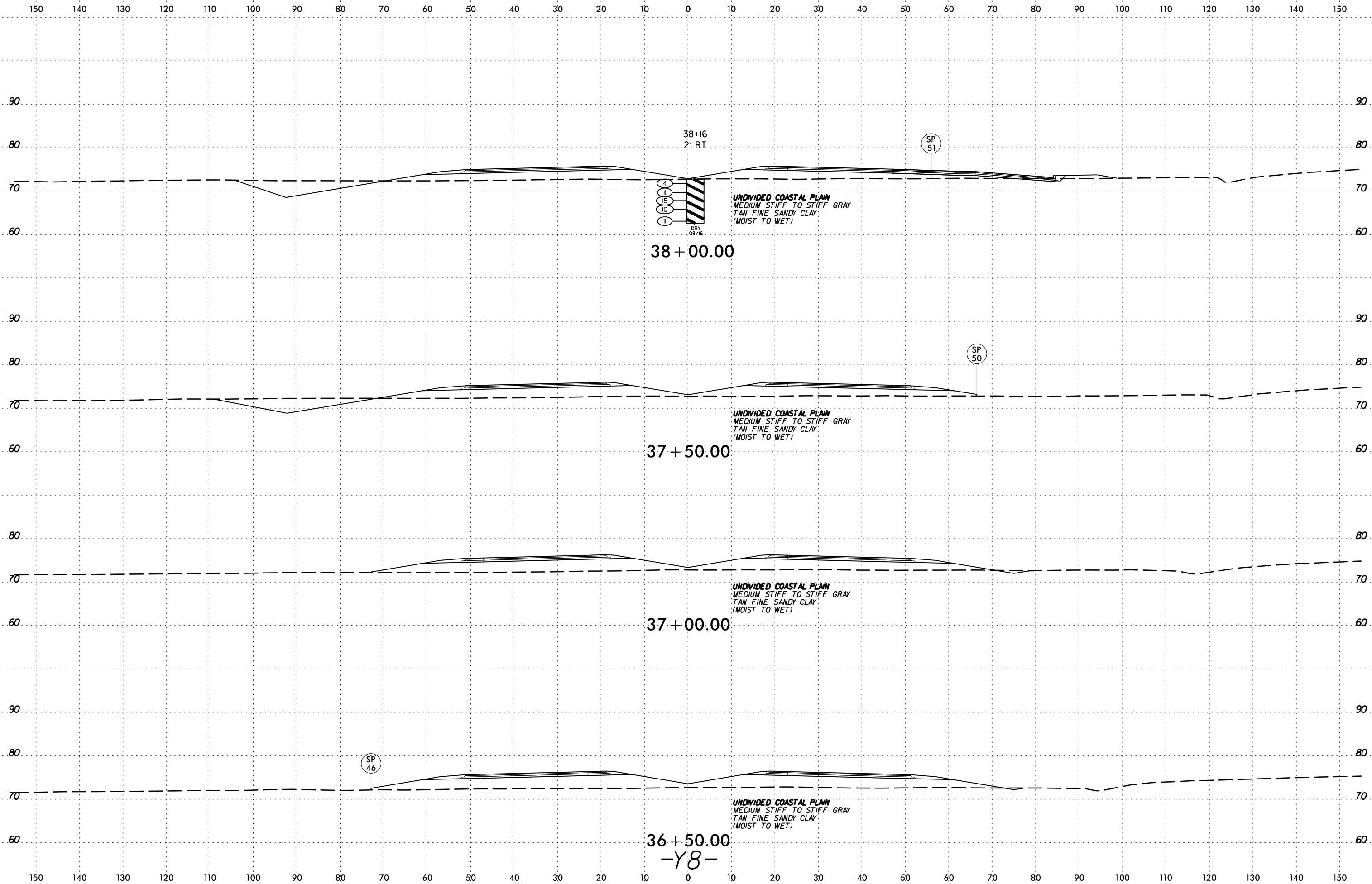
6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
135



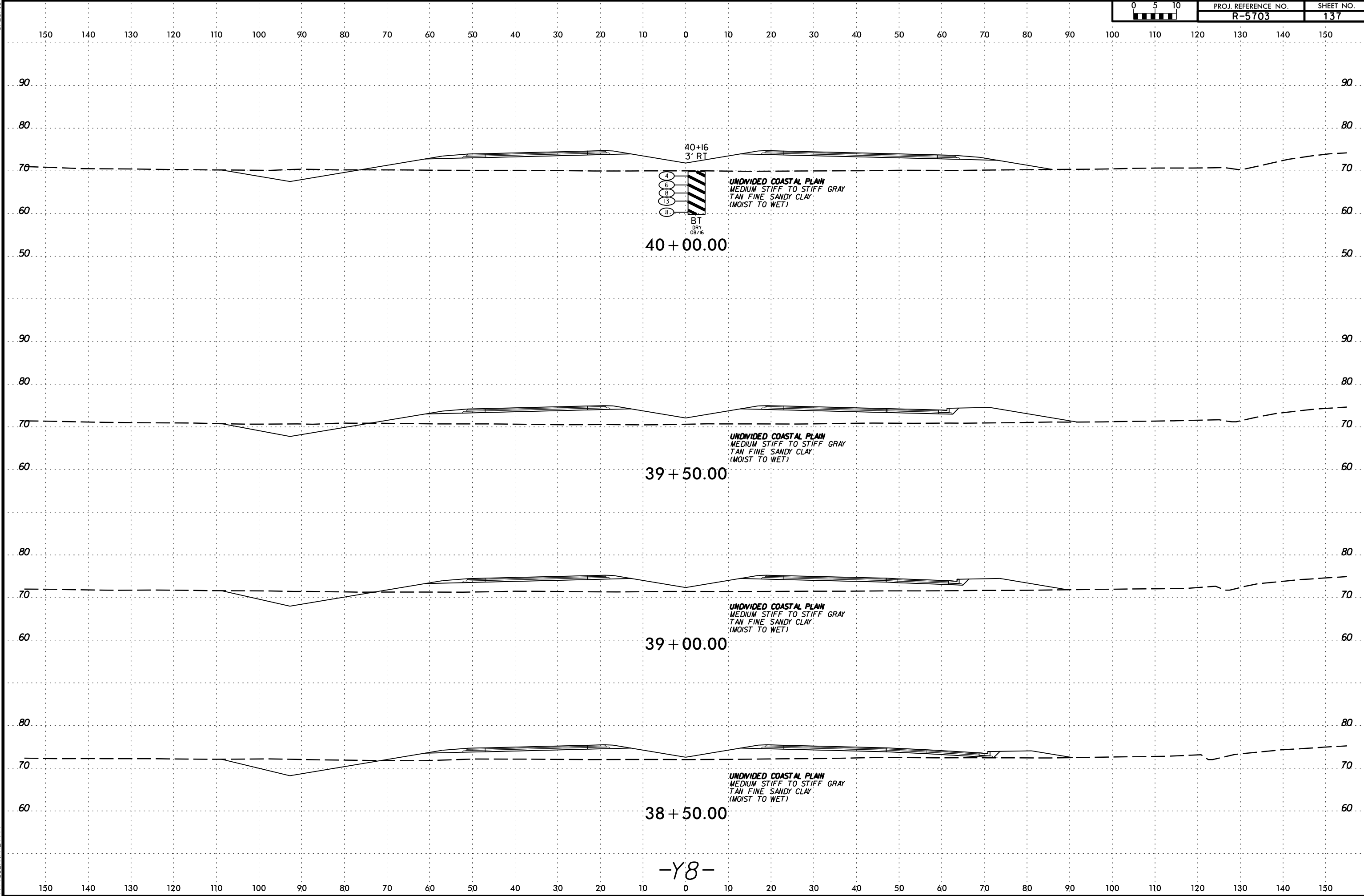


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
137



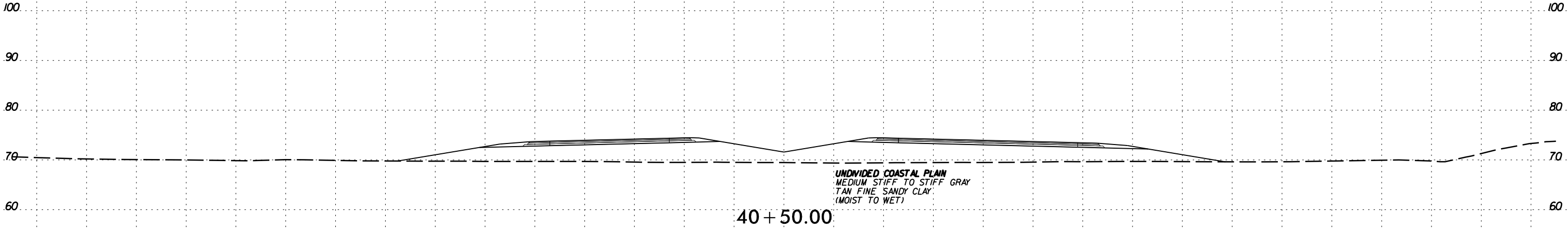
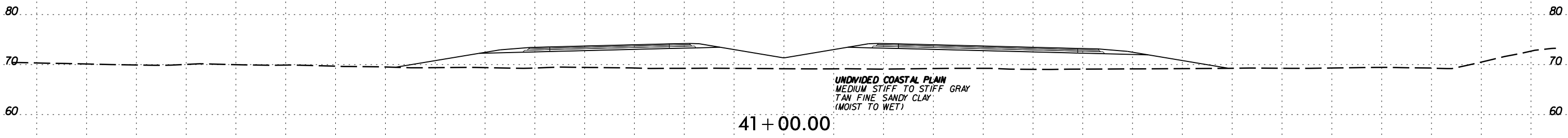
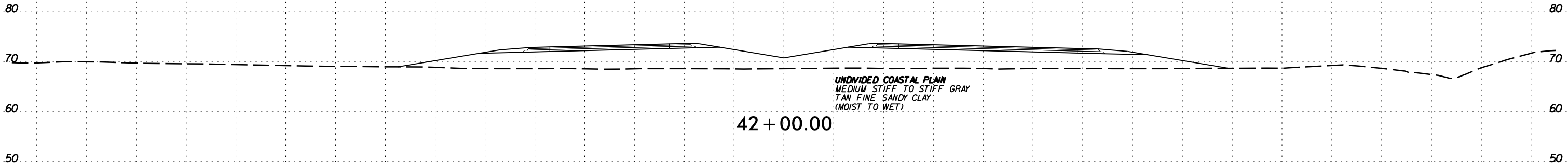
6/23/16



PROJ. REFERENCE NO.  
R-5703

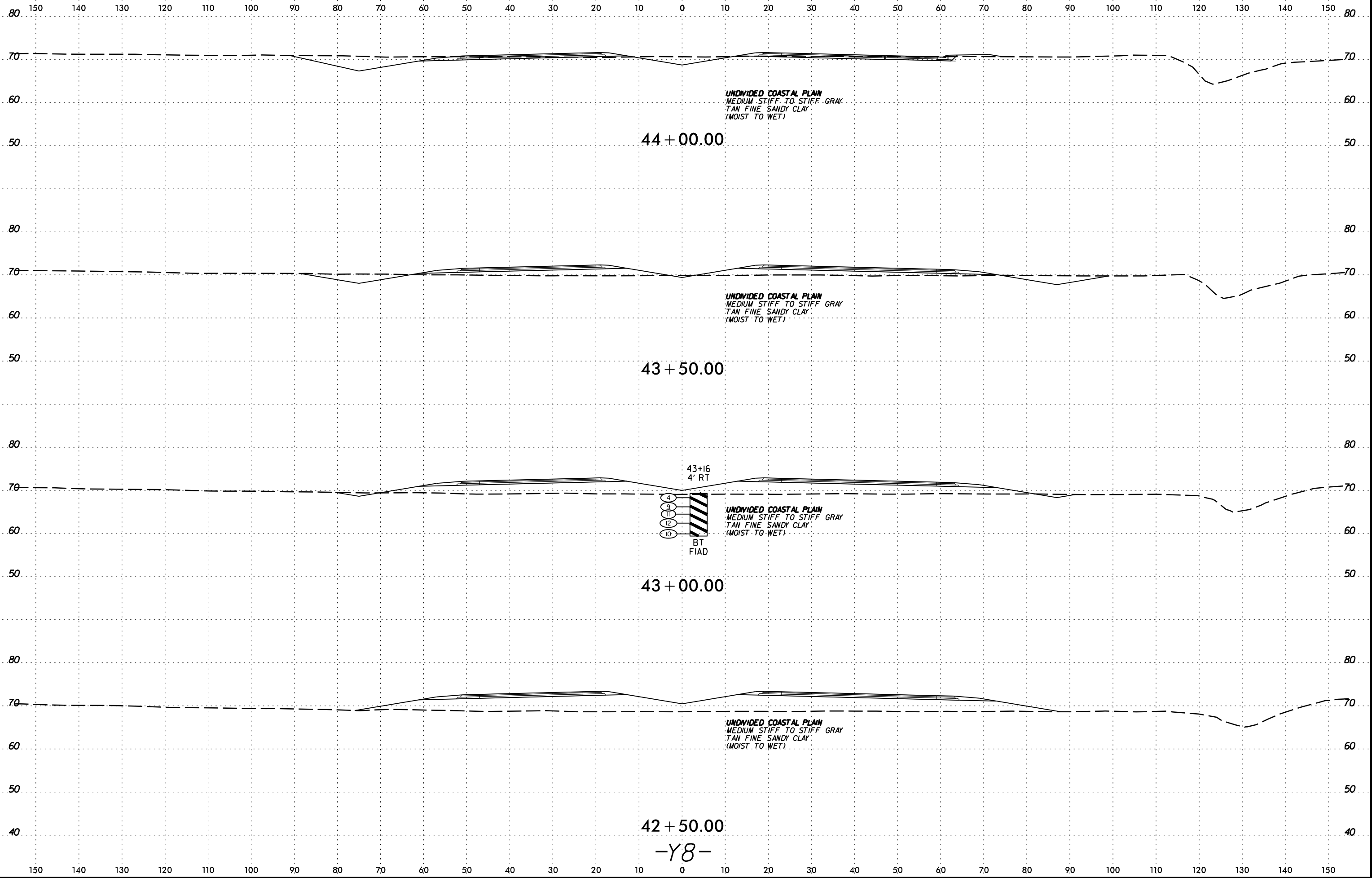
SHEET NO.  
138

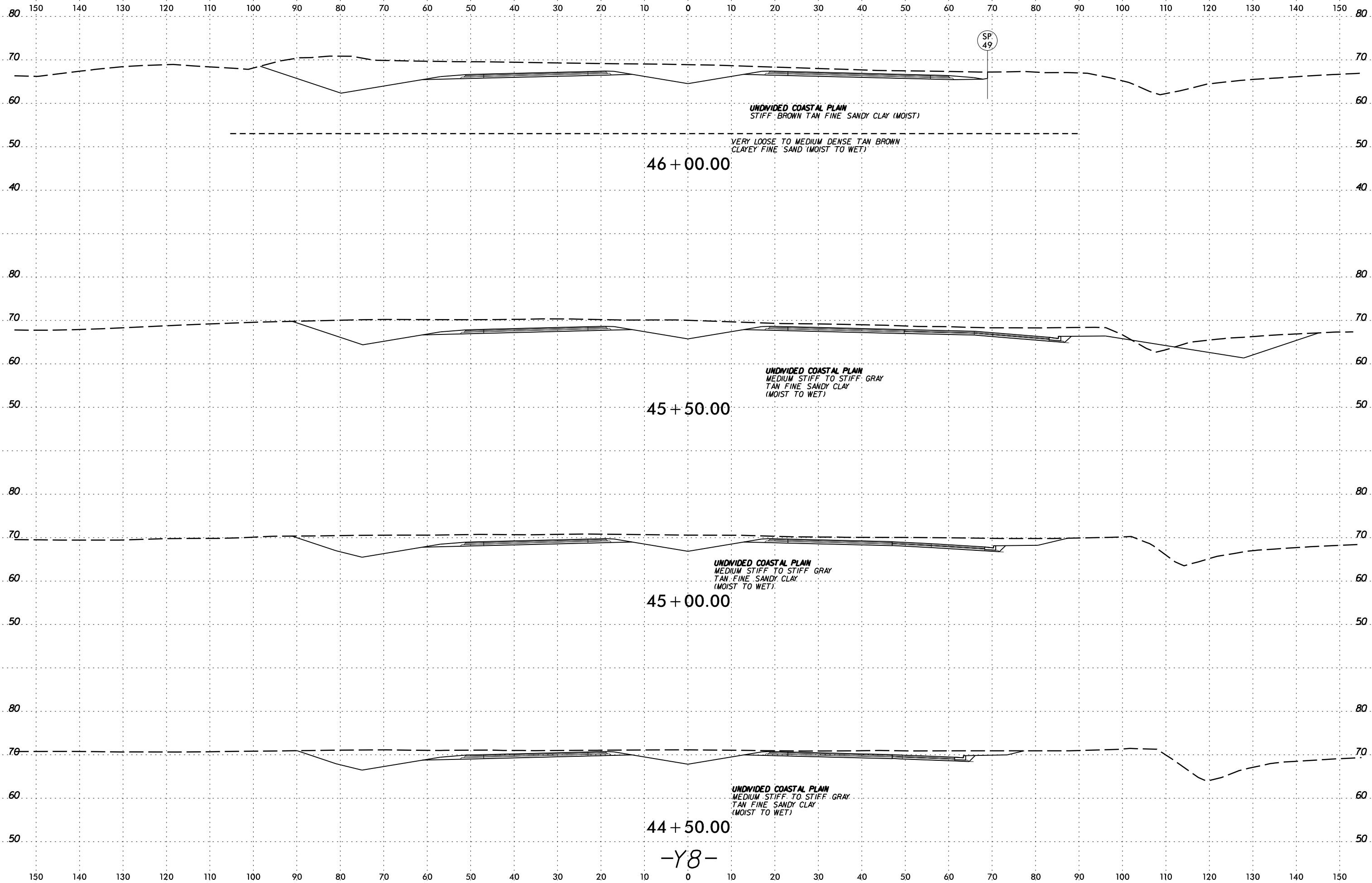
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



-Y8-

SECTION  
SURNAME



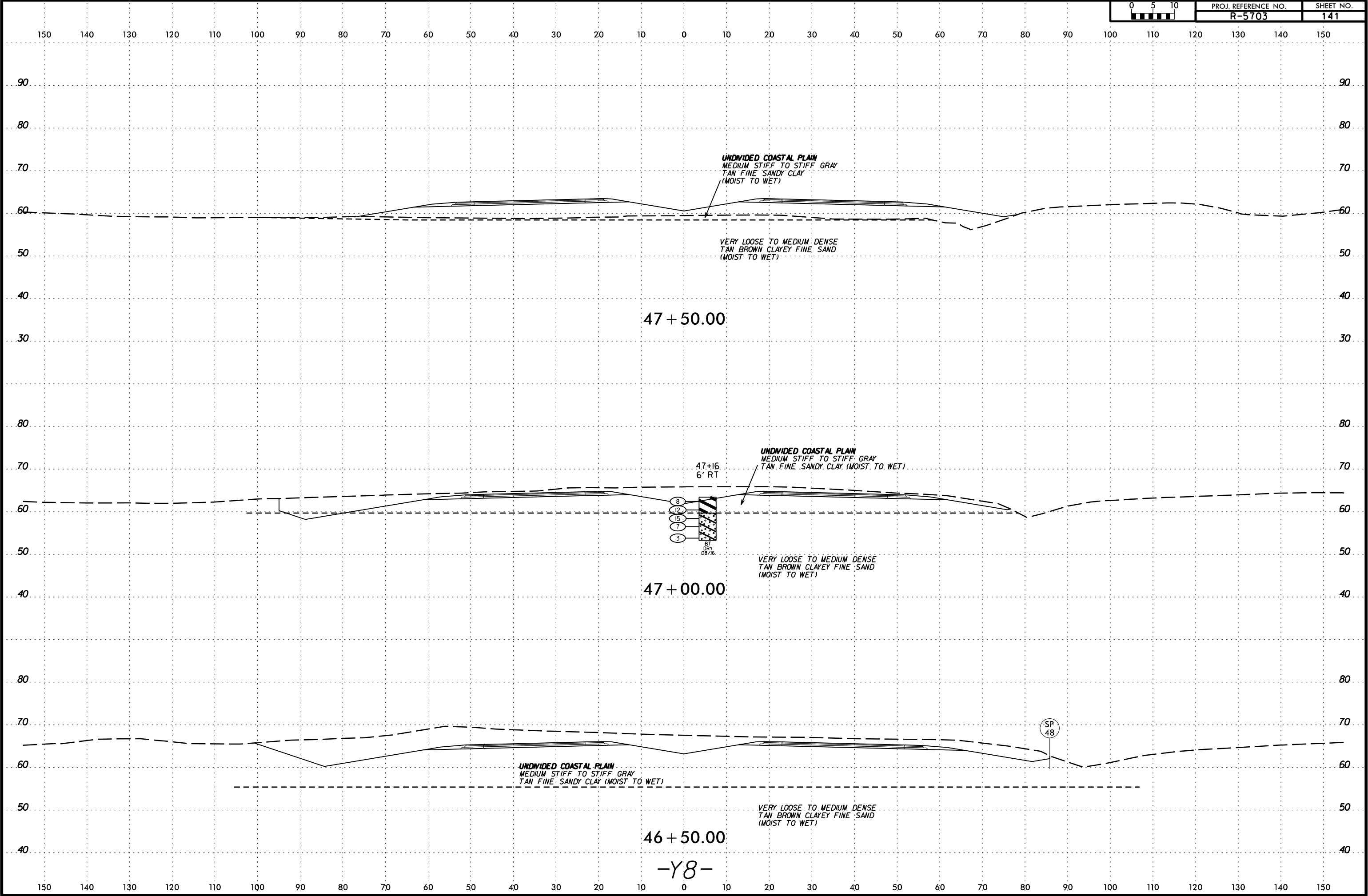


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
141



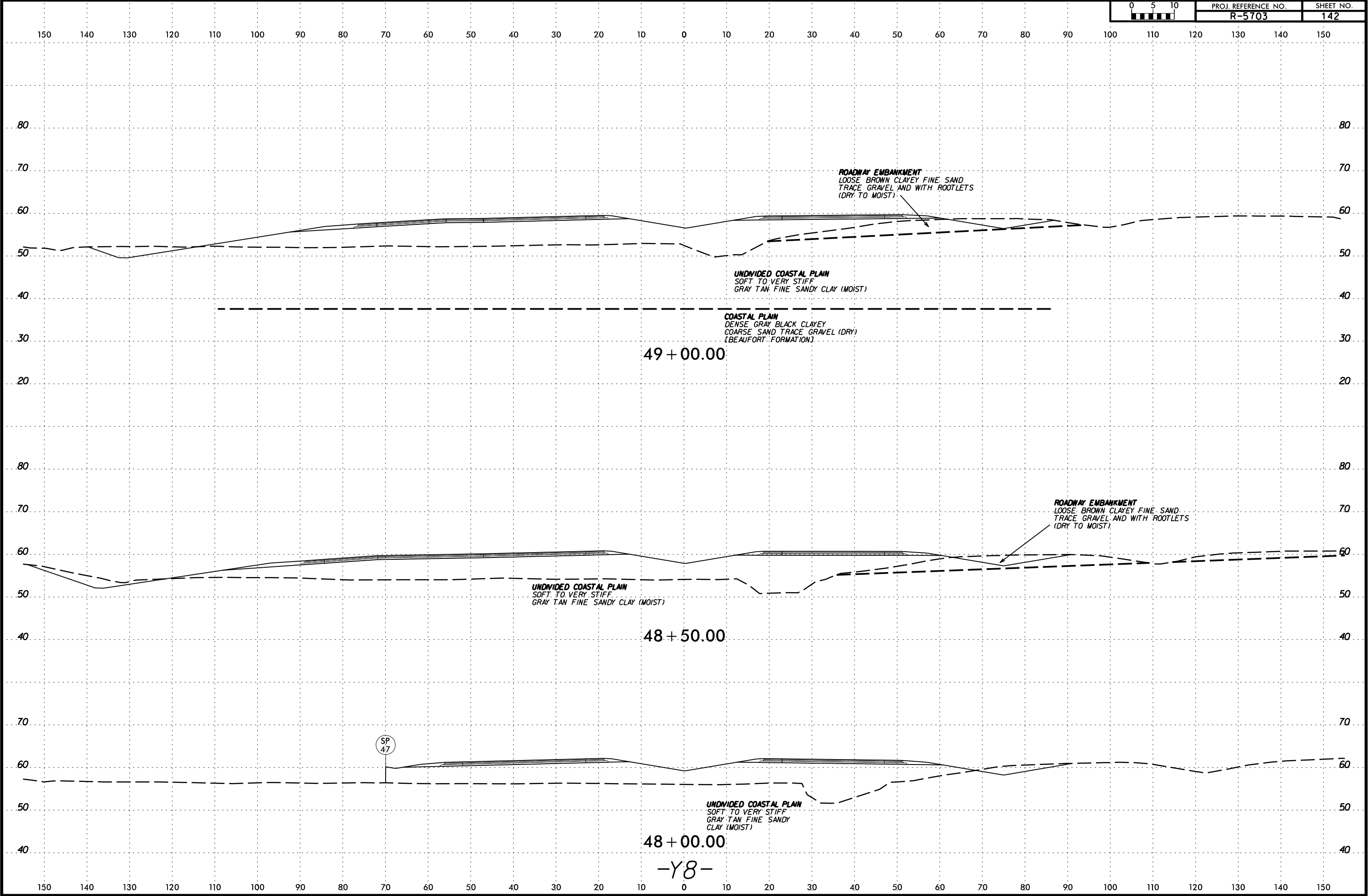


6/23/16



PROJ. REFERENCE NO.  
R-5703

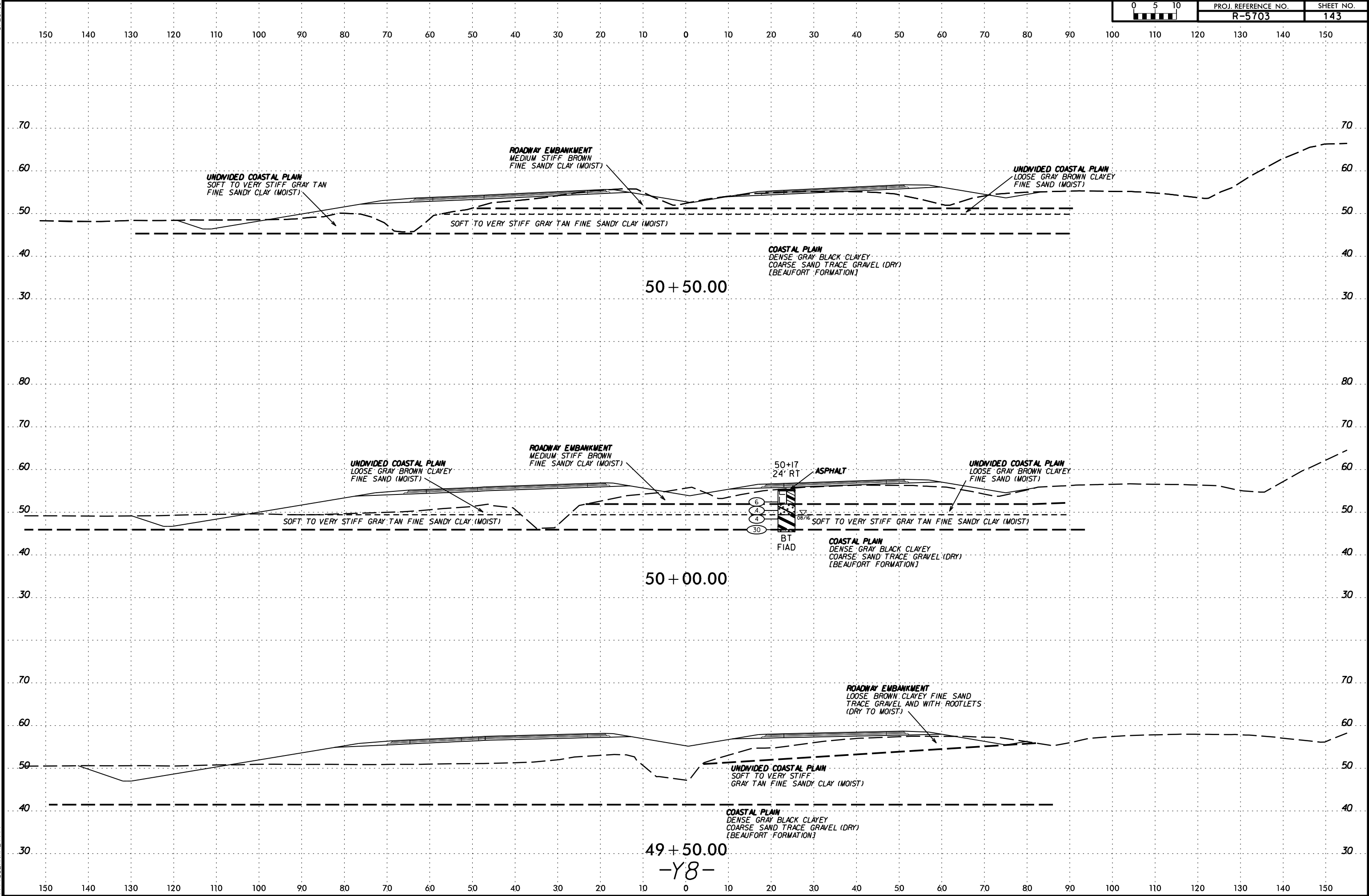
SHEET NO.  
142



6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	143



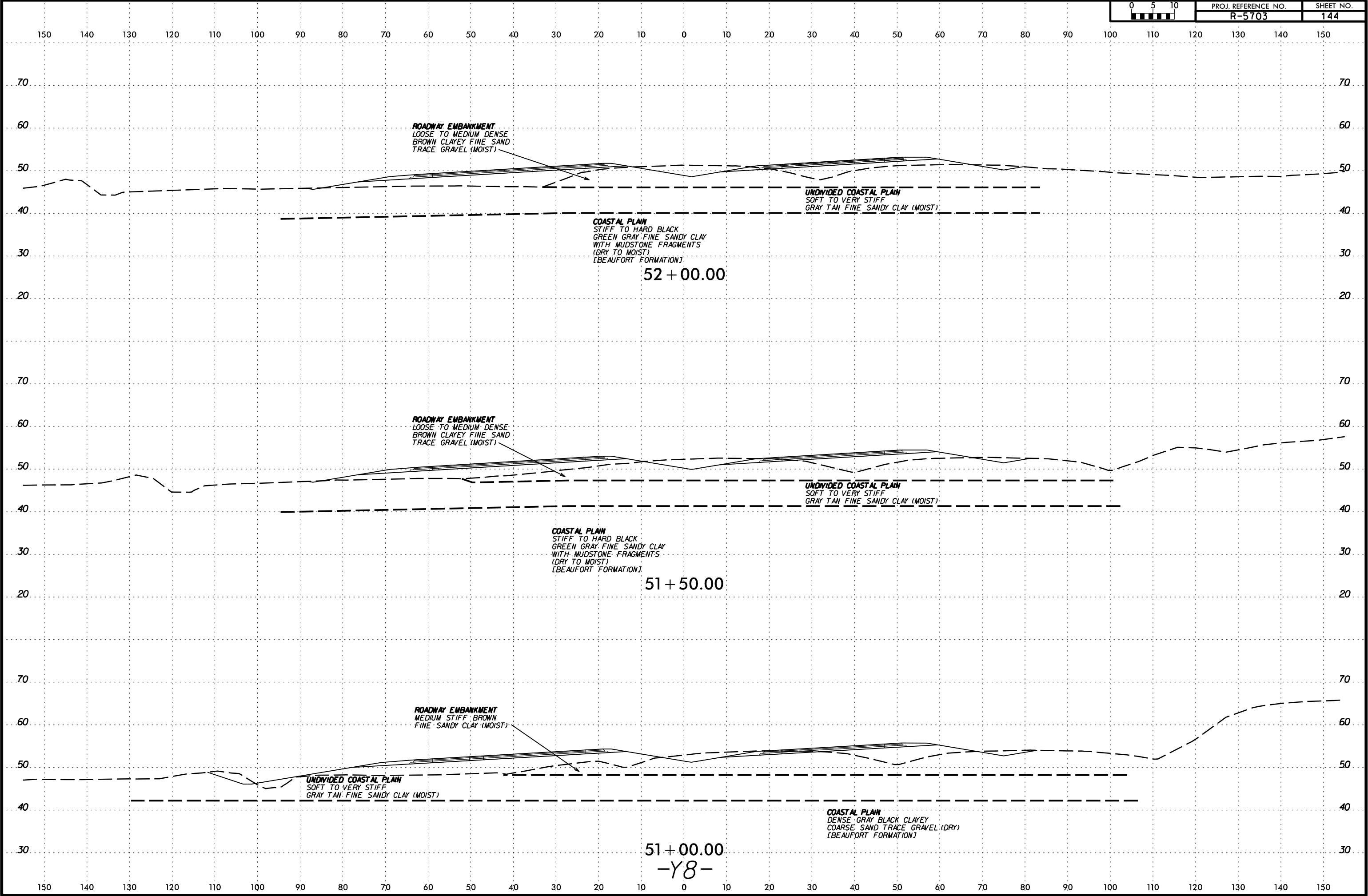
SECTION 143-16  
SUBAREA 143-16

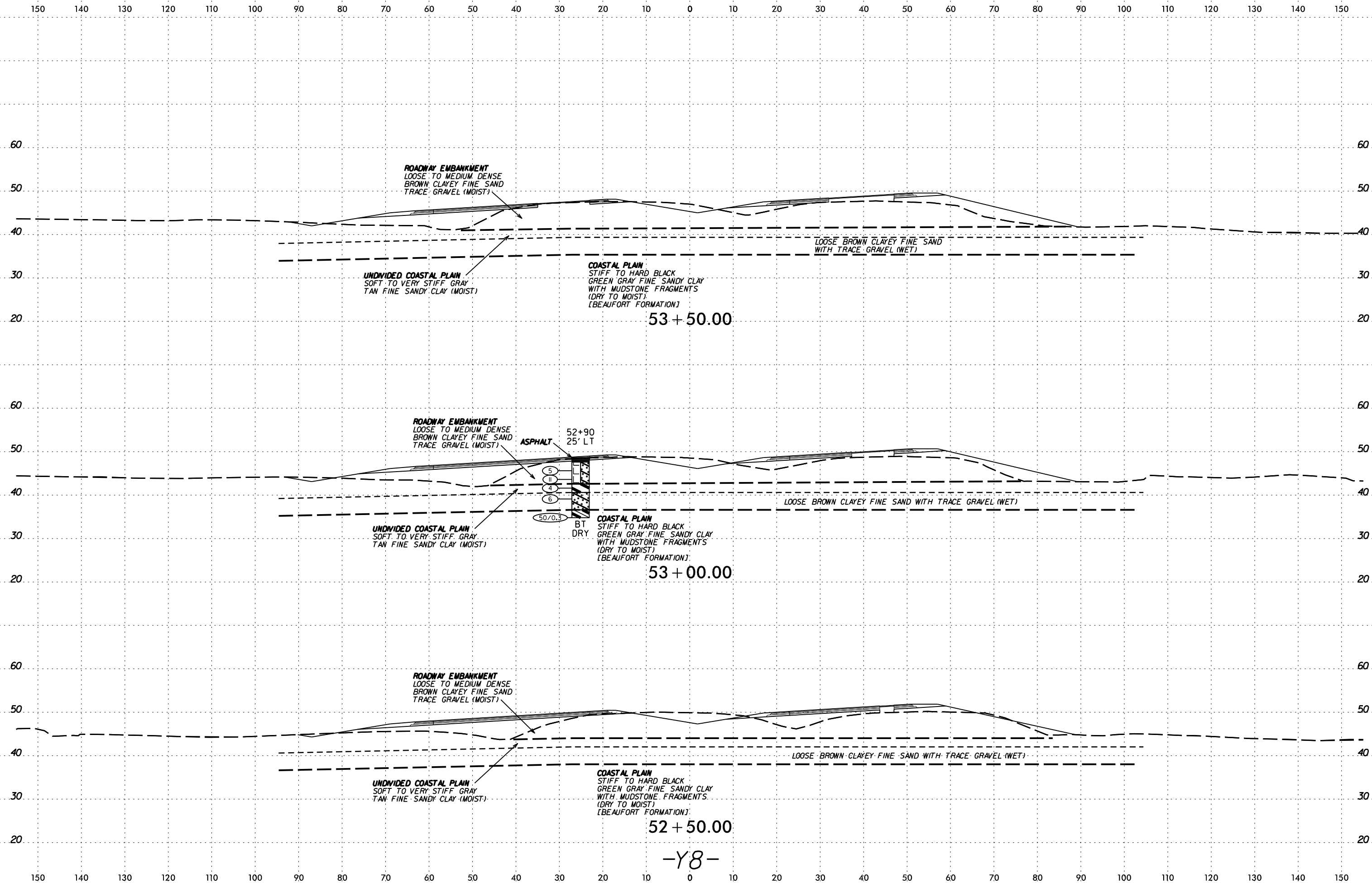
6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
144

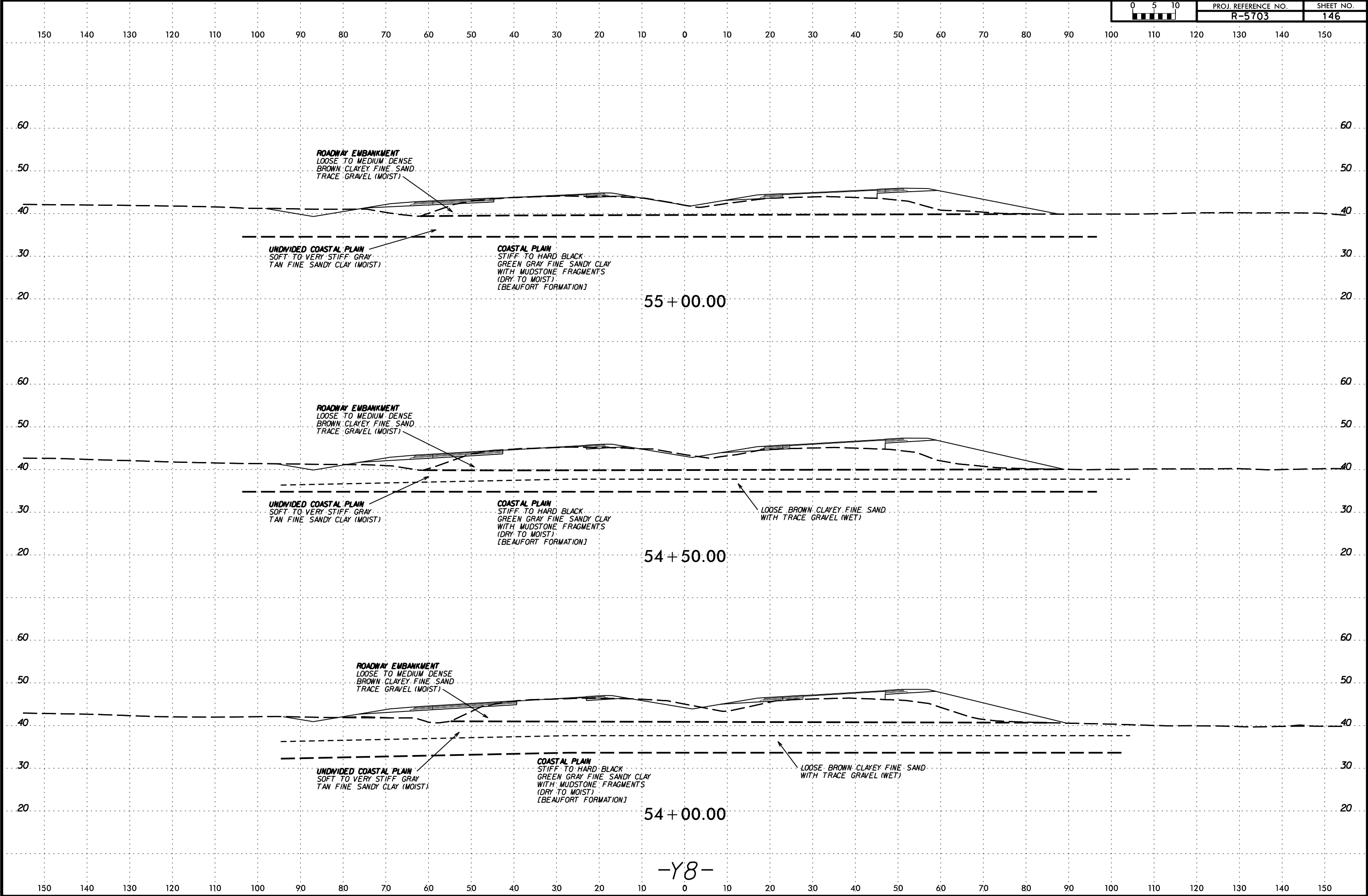




6/23/16



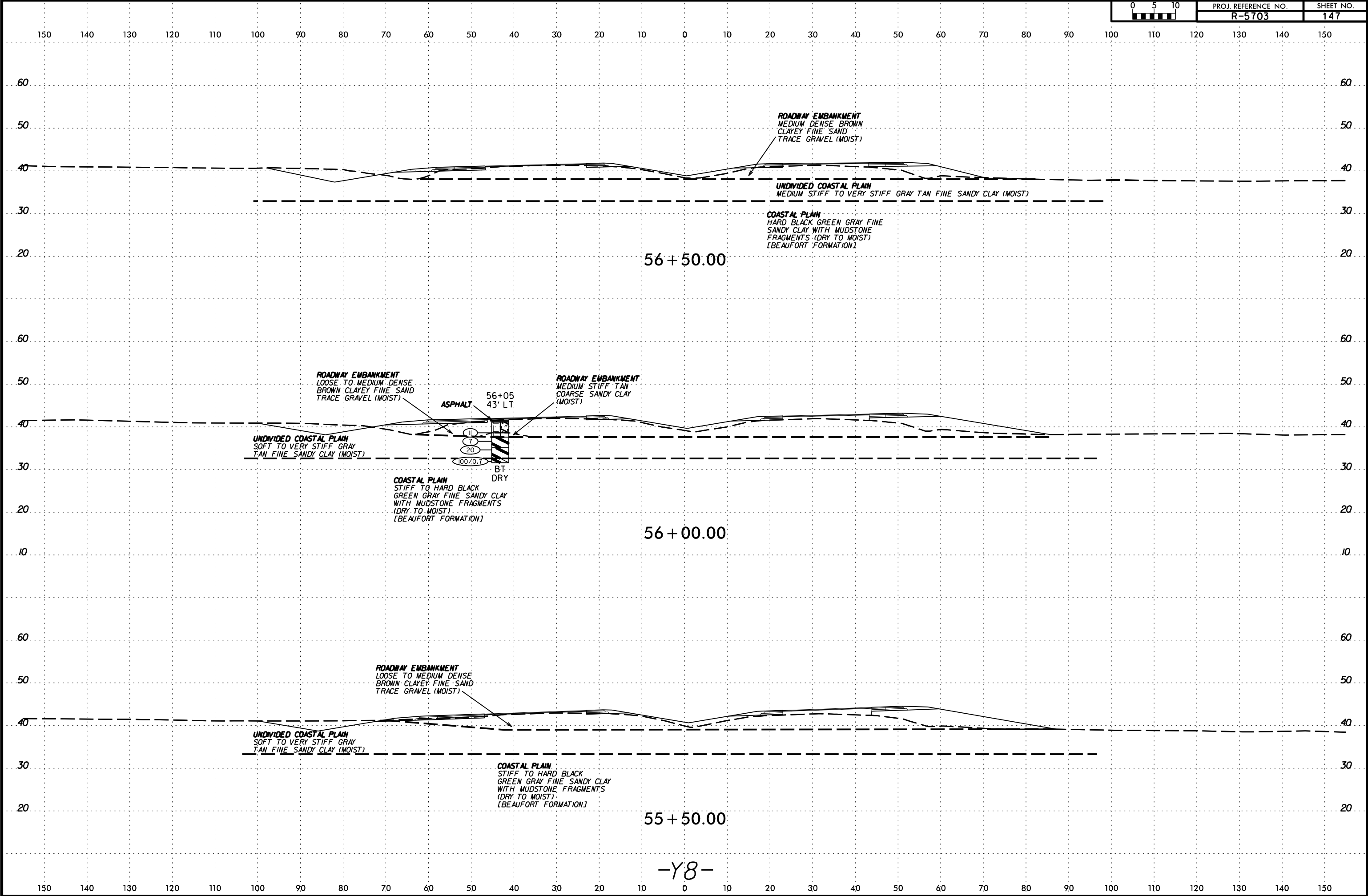
PROJ. REFERENCE NO.	SHEET NO.
R-5703	146



6/23/16



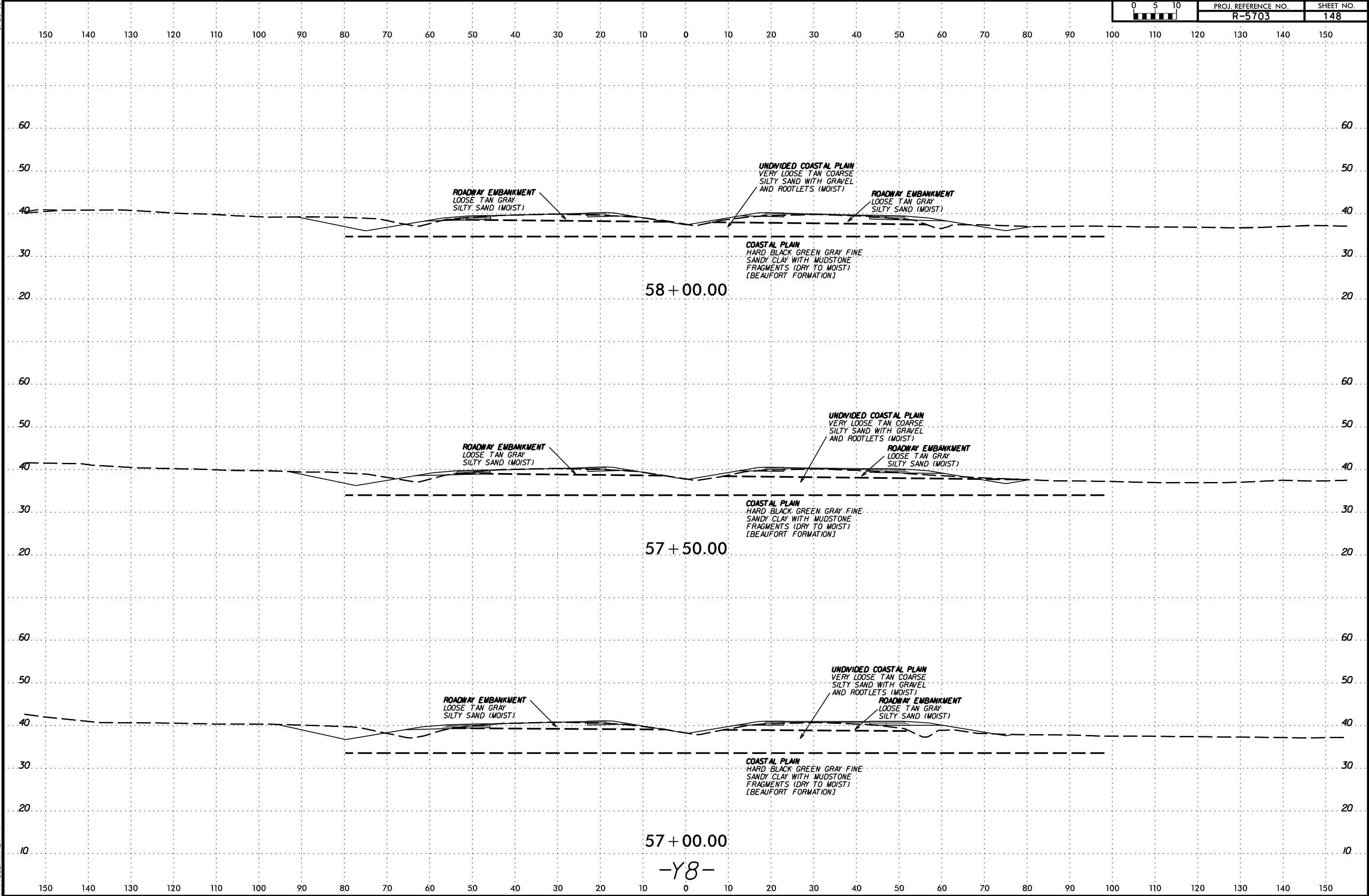
PROJ. REFERENCE NO.	SHEET NO.
R-5703	147

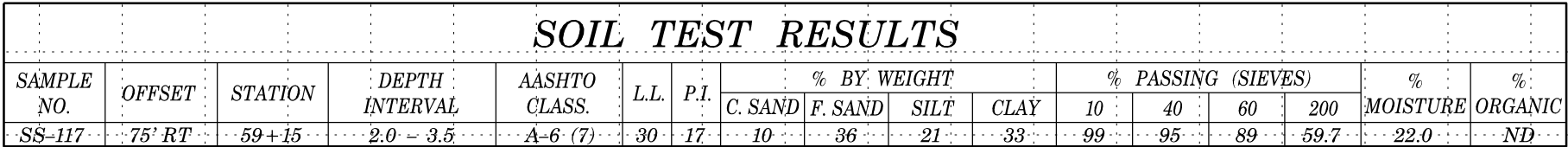


6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	148





\$\$\$SYTIME\$\$\$\$\$  
 \$\$\$DCN\$\$\$\$\$  
 \$\$\$USERNAME\$\$\$

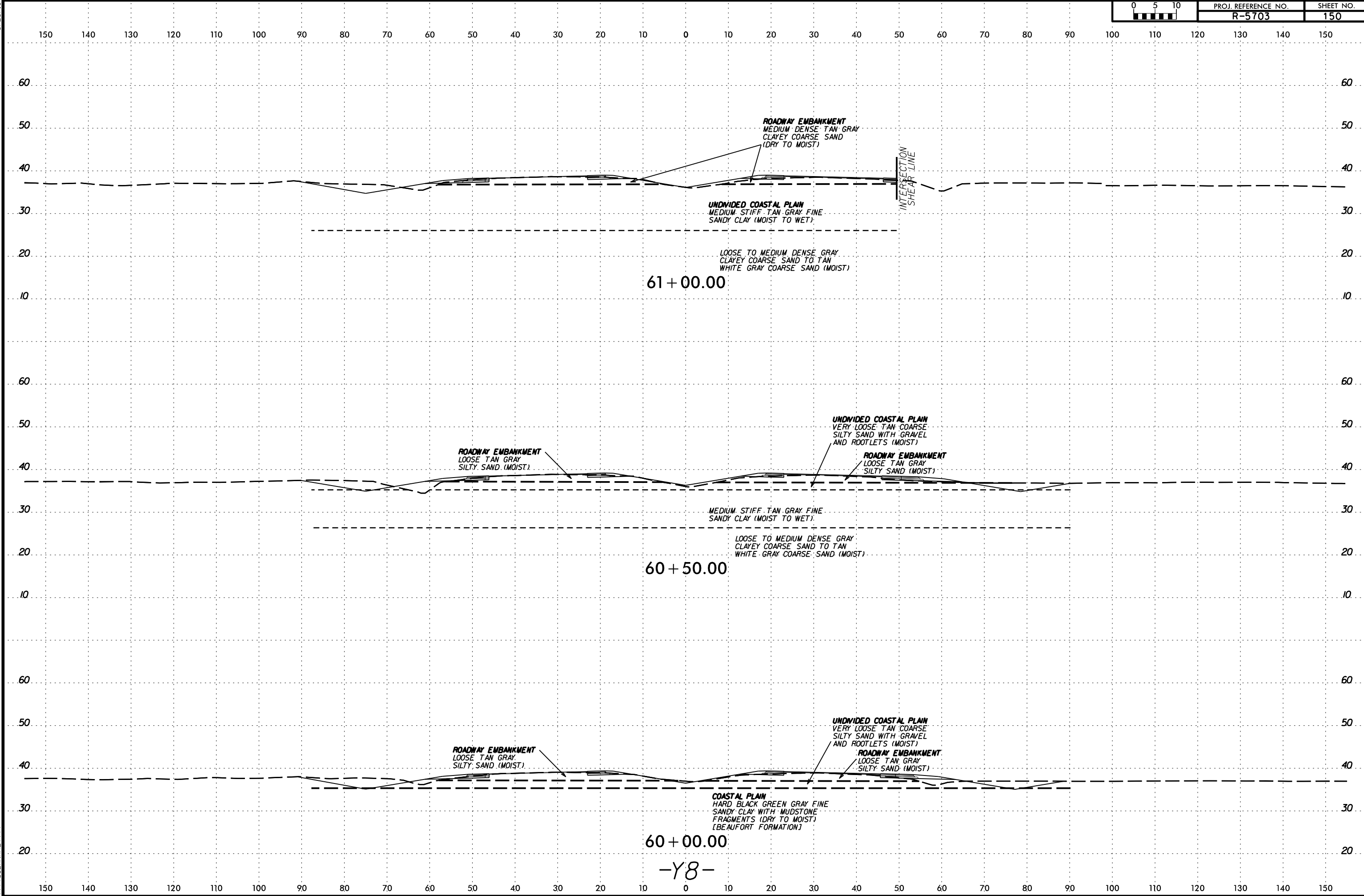


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
150

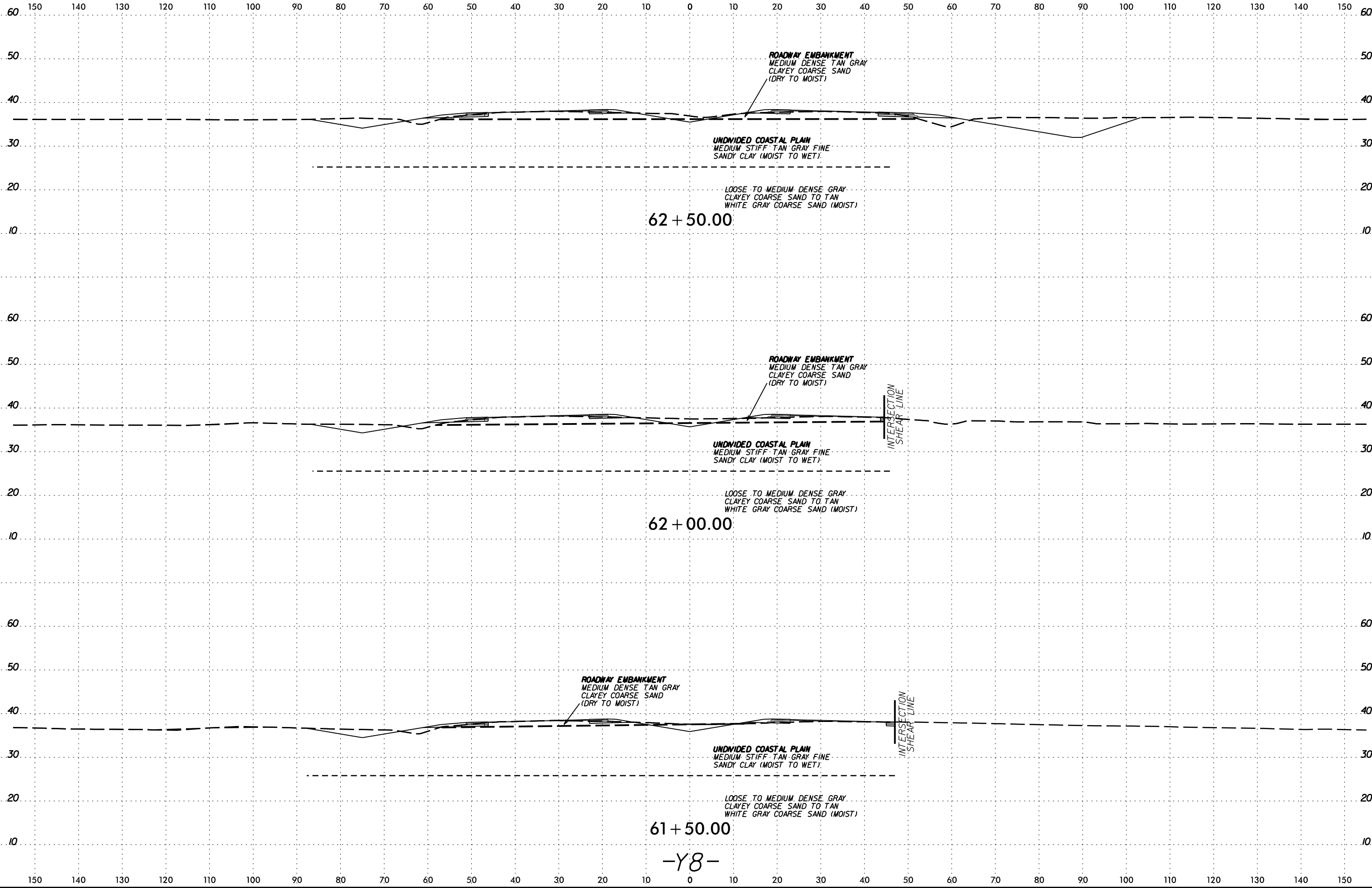


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
151



6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
152

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

60  
50  
40  
30  
20  
10

60  
50  
40  
30  
20  
10

SYNTHETIC  
CONCRETE  
CURB  
RETAINING  
WALL

ROADWAY EMBANKMENT  
MEDIUM DENSE TAN GRAY  
CLAYEY COARSE SAND  
(DRY TO MOIST)

UNDIVIDED COASTAL PLAIN  
MEDIUM STIFF TAN GRAY FINE  
SANDY CLAY (MOIST TO WET)

LOOSE TO MEDIUM DENSE GRAY  
CLAYEY COARSE SAND TO TAN  
WHITE GRAY COARSE SAND (MOIST)

63+00.00

-Y8-

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

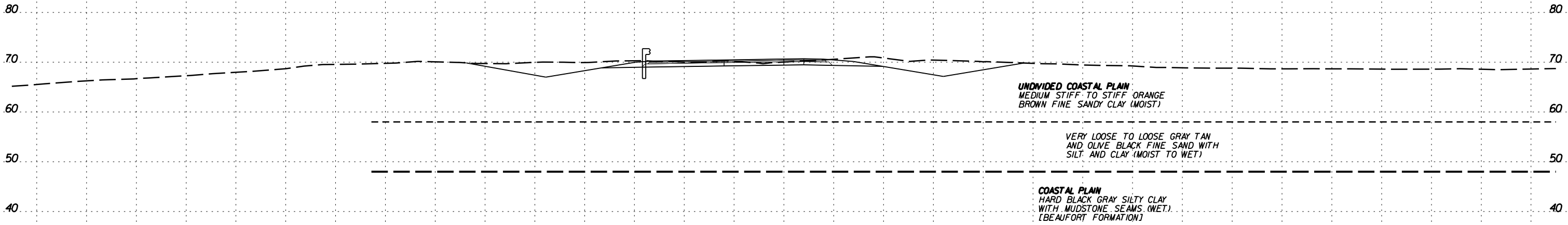
6/23/16



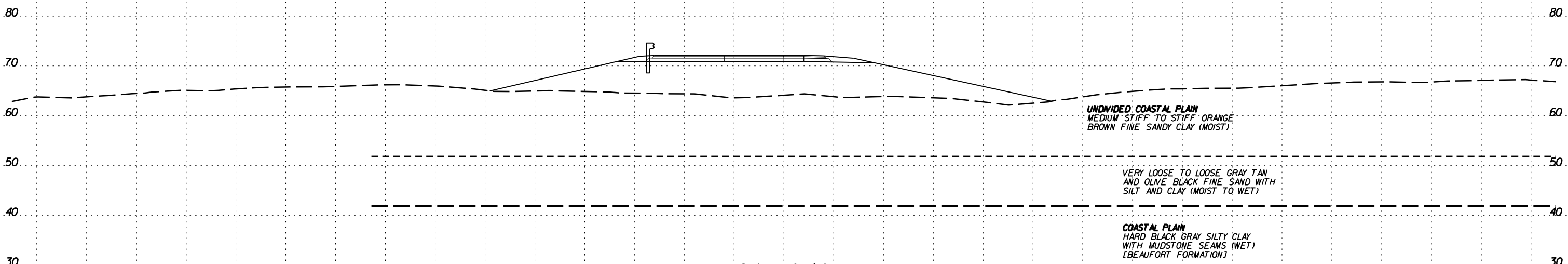
PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
153

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



24 + 59.00



24 + 10.68

-Y8RPA-

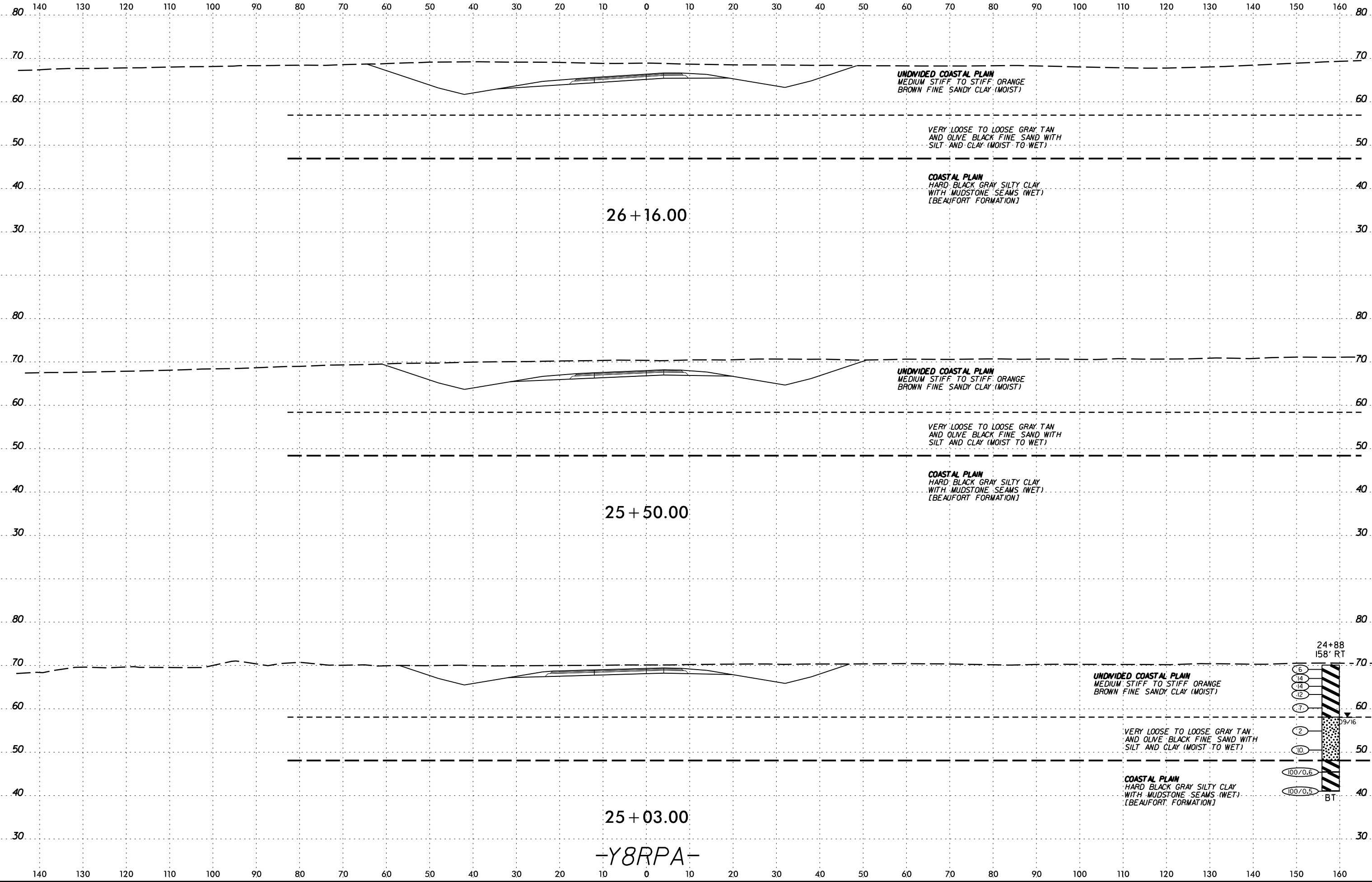
SYNTHETIC  
SECTION  
SURNAME

6/23/16



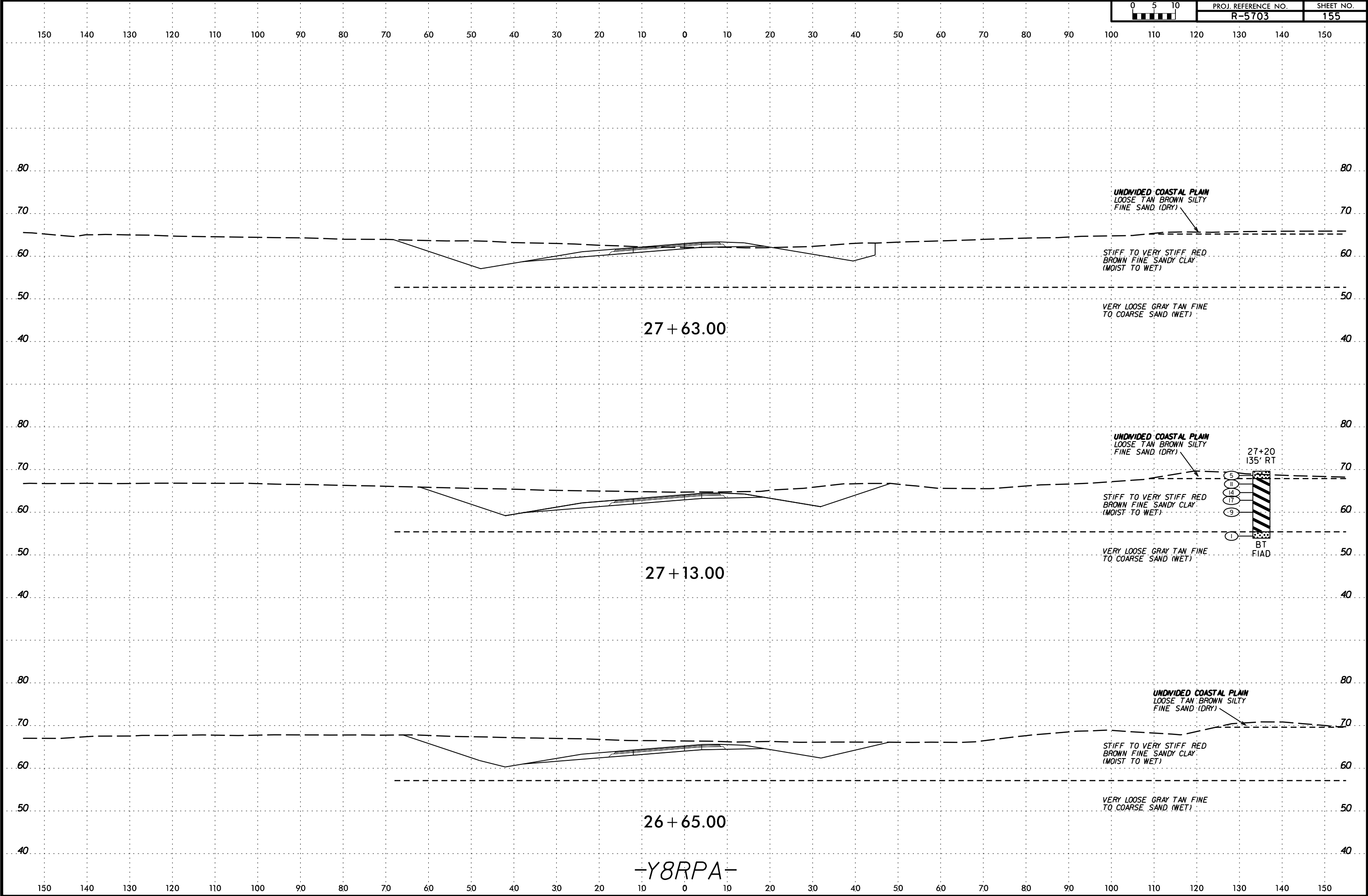
PROJ. REFERENCE NO.  
R-5703

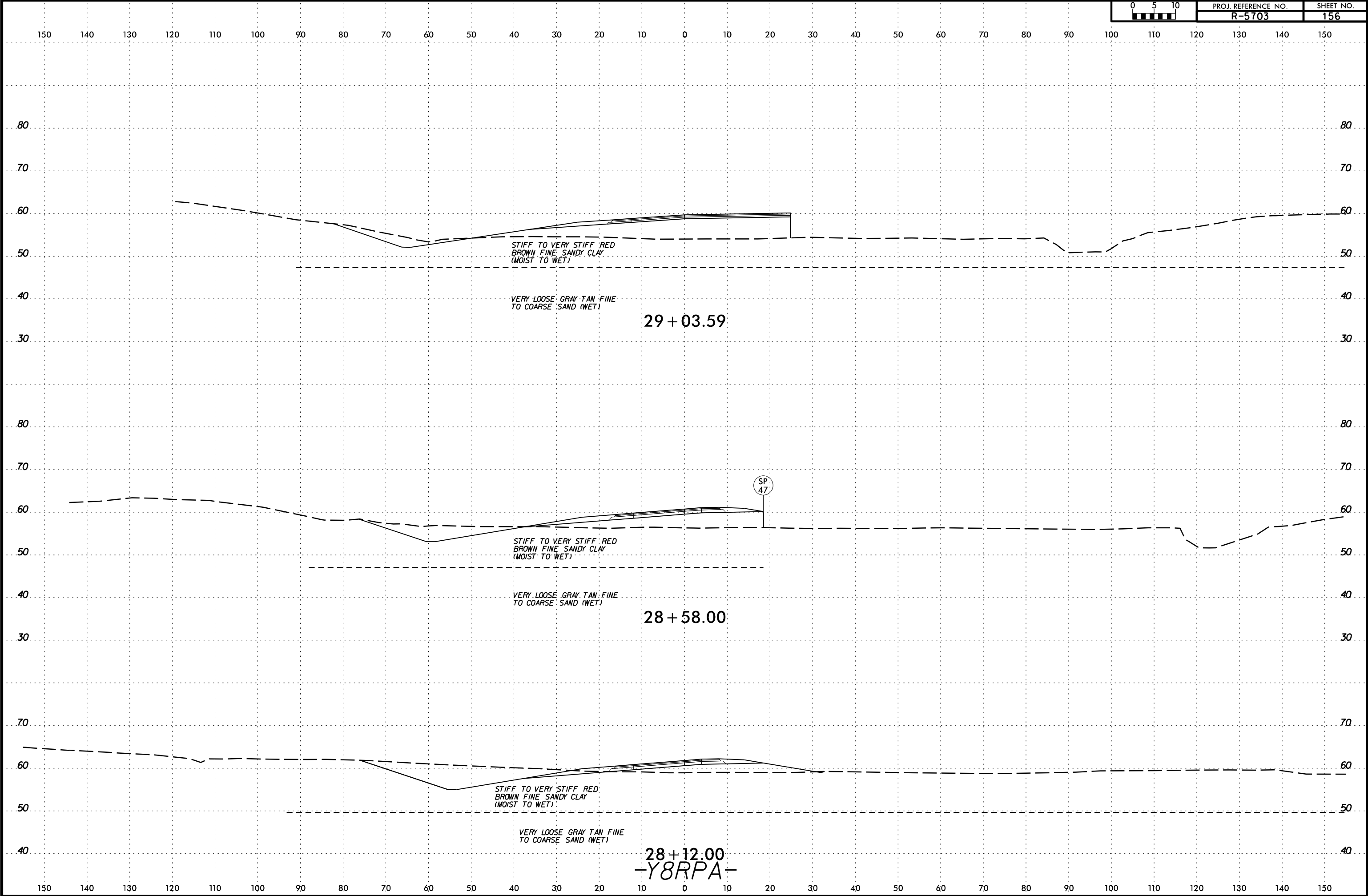
SHEET NO.  
154





PROJ. REFERENCE NO.	SHEET NO.
R-5703	155





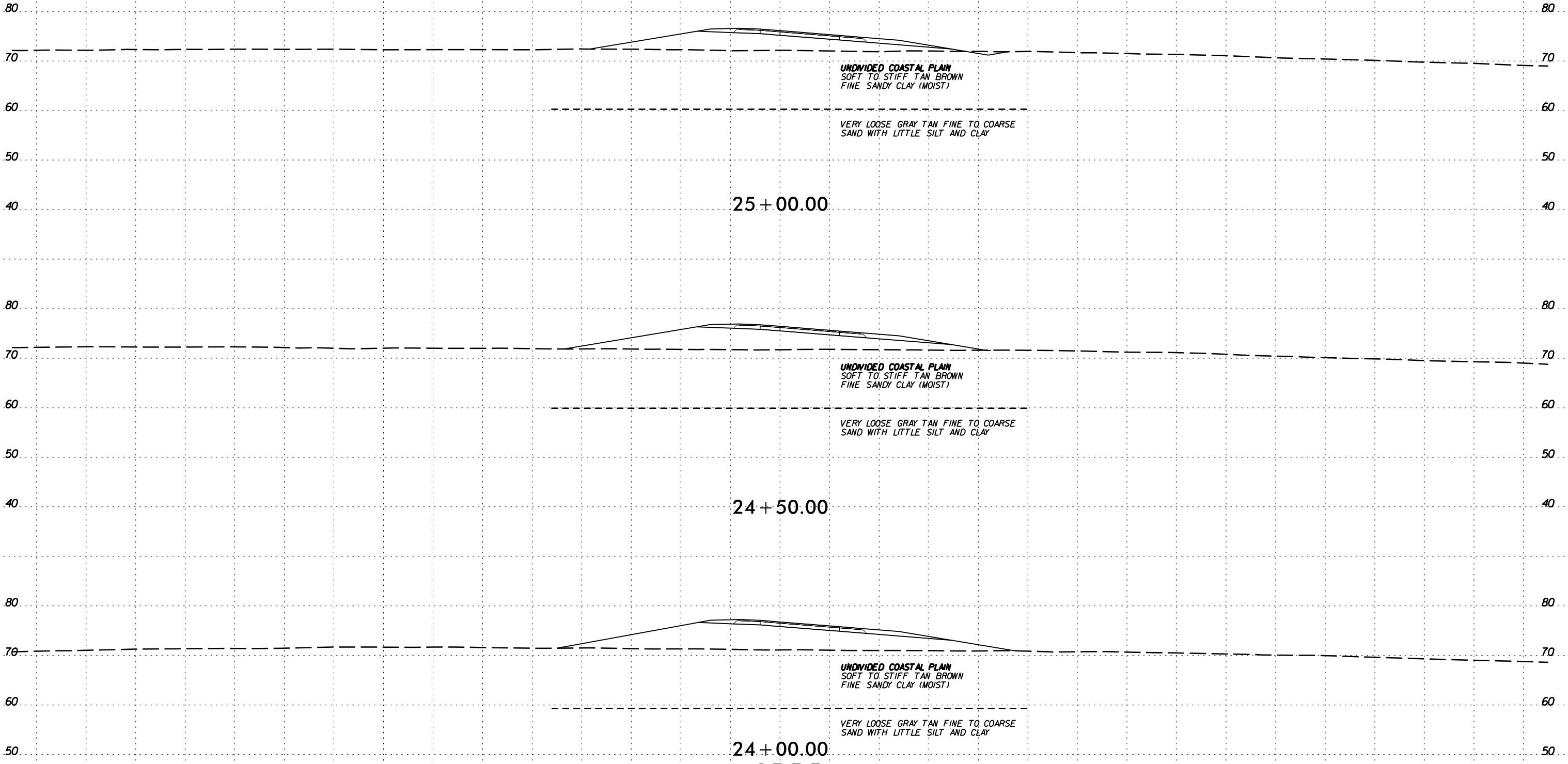
6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
157

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



UNDIVIDED COASTAL PLAIN  
SOFT TO STIFF TAN BROWN  
FINE SANDY CLAY (MOIST)

VERY LOOSE GRAY TAN FINE TO COARSE  
SAND WITH LITTLE SILT AND CLAY

25 + 00.00

UNDIVIDED COASTAL PLAIN  
SOFT TO STIFF TAN BROWN  
FINE SANDY CLAY (MOIST)

VERY LOOSE GRAY TAN FINE TO COARSE  
SAND WITH LITTLE SILT AND CLAY

24 + 50.00

UNDIVIDED COASTAL PLAIN  
SOFT TO STIFF TAN BROWN  
FINE SANDY CLAY (MOIST)

VERY LOOSE GRAY TAN FINE TO COARSE  
SAND WITH LITTLE SILT AND CLAY

24 + 00.00

-Y8RPB-

SYNTHETIC SECTION  
SURFACE

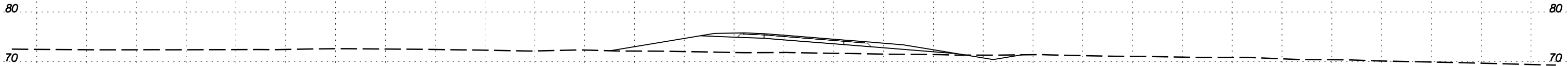


6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	158

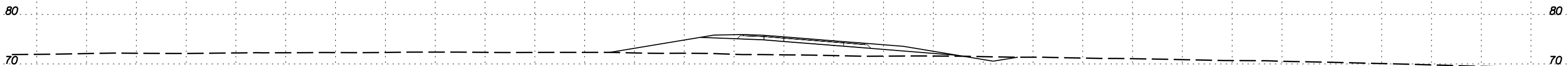
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



UNDIVIDED COASTAL PLAIN  
SOFT TO STIFF TAN BROWN  
FINE SANDY CLAY (MOIST)

VERY LOOSE GRAY TAN FINE TO COARSE  
SAND WITH LITTLE SILT AND CLAY

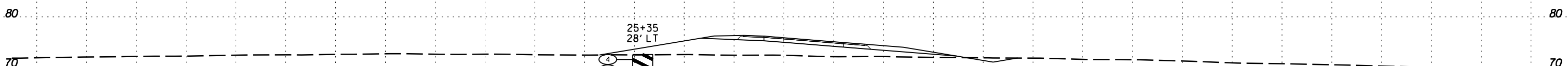
26 + 28.00



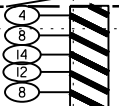
UNDIVIDED COASTAL PLAIN  
SOFT TO STIFF TAN BROWN  
FINE SANDY CLAY (MOIST)

VERY LOOSE GRAY TAN FINE TO COARSE  
SAND WITH LITTLE SILT AND CLAY

26 + 00.00



25+35  
28' LT



BT  
DRY  
NO /16

UNDIVIDED COASTAL PLAIN  
SOFT TO STIFF TAN BROWN  
FINE SANDY CLAY (MOIST)

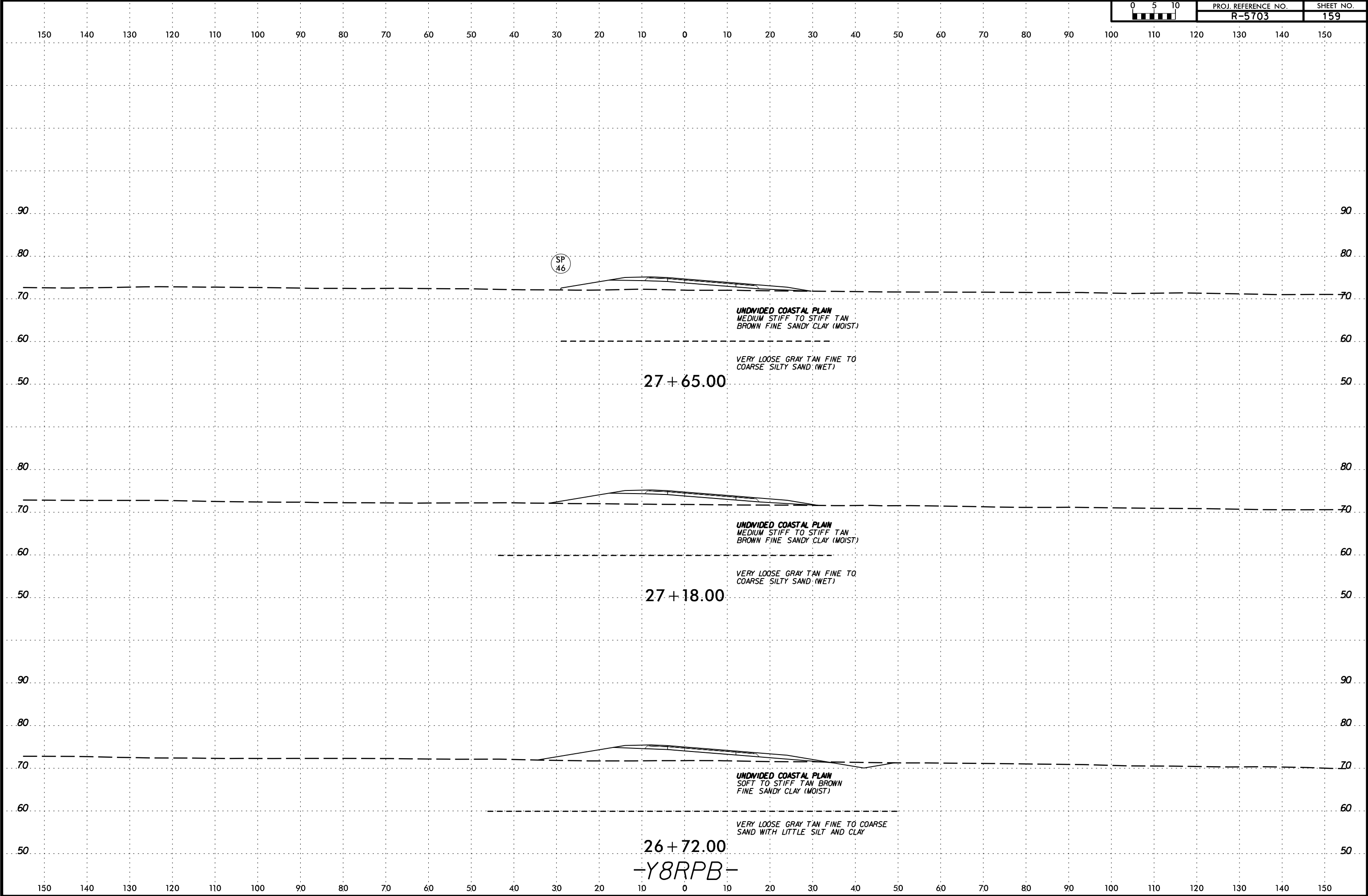
VERY LOOSE GRAY TAN FINE TO COARSE  
SAND WITH LITTLE SILT AND CLAY

25 + 50.00

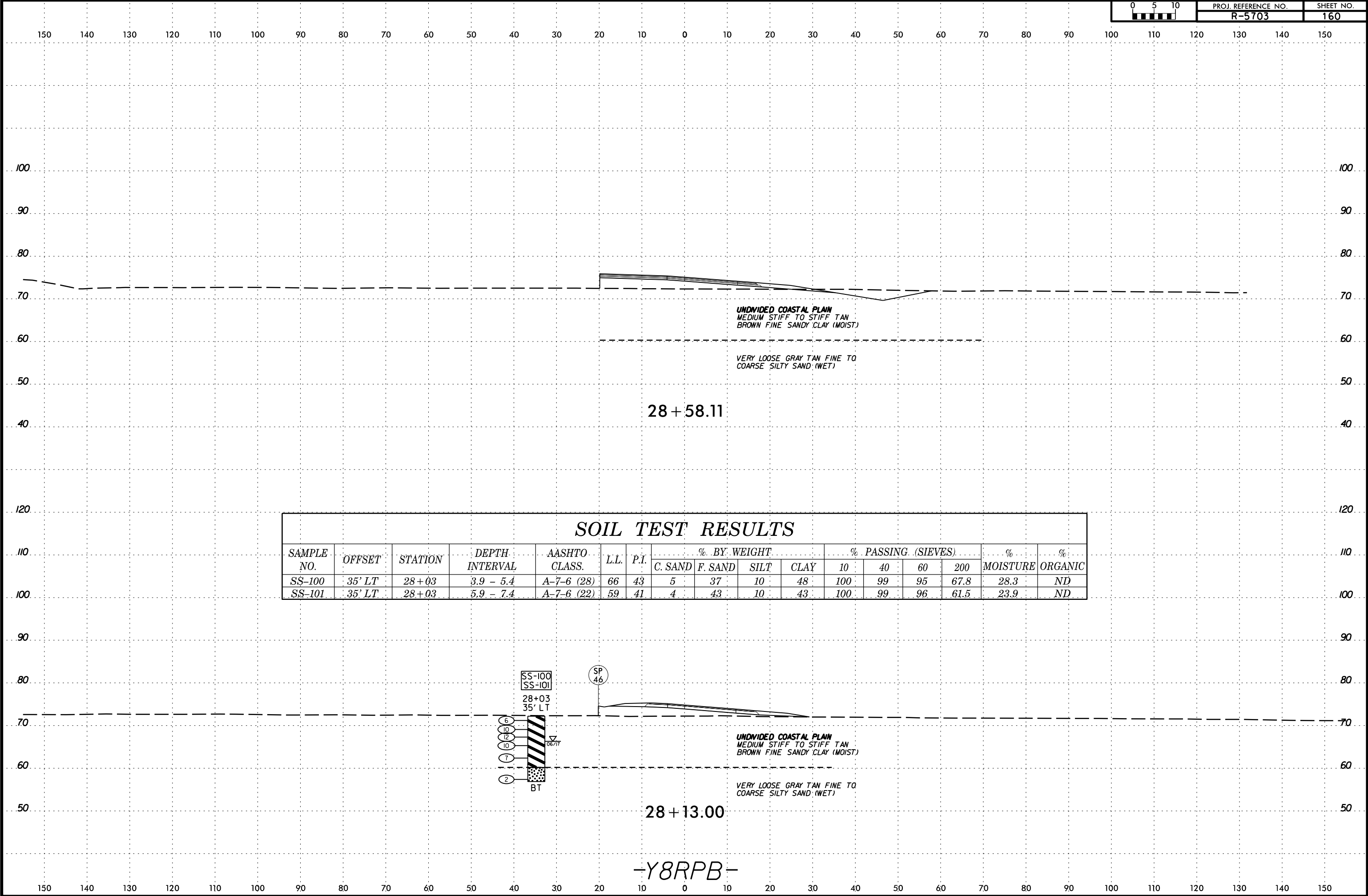
-Y8RPB-

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

SYNTHETIC  
CONCRETE  
CURB

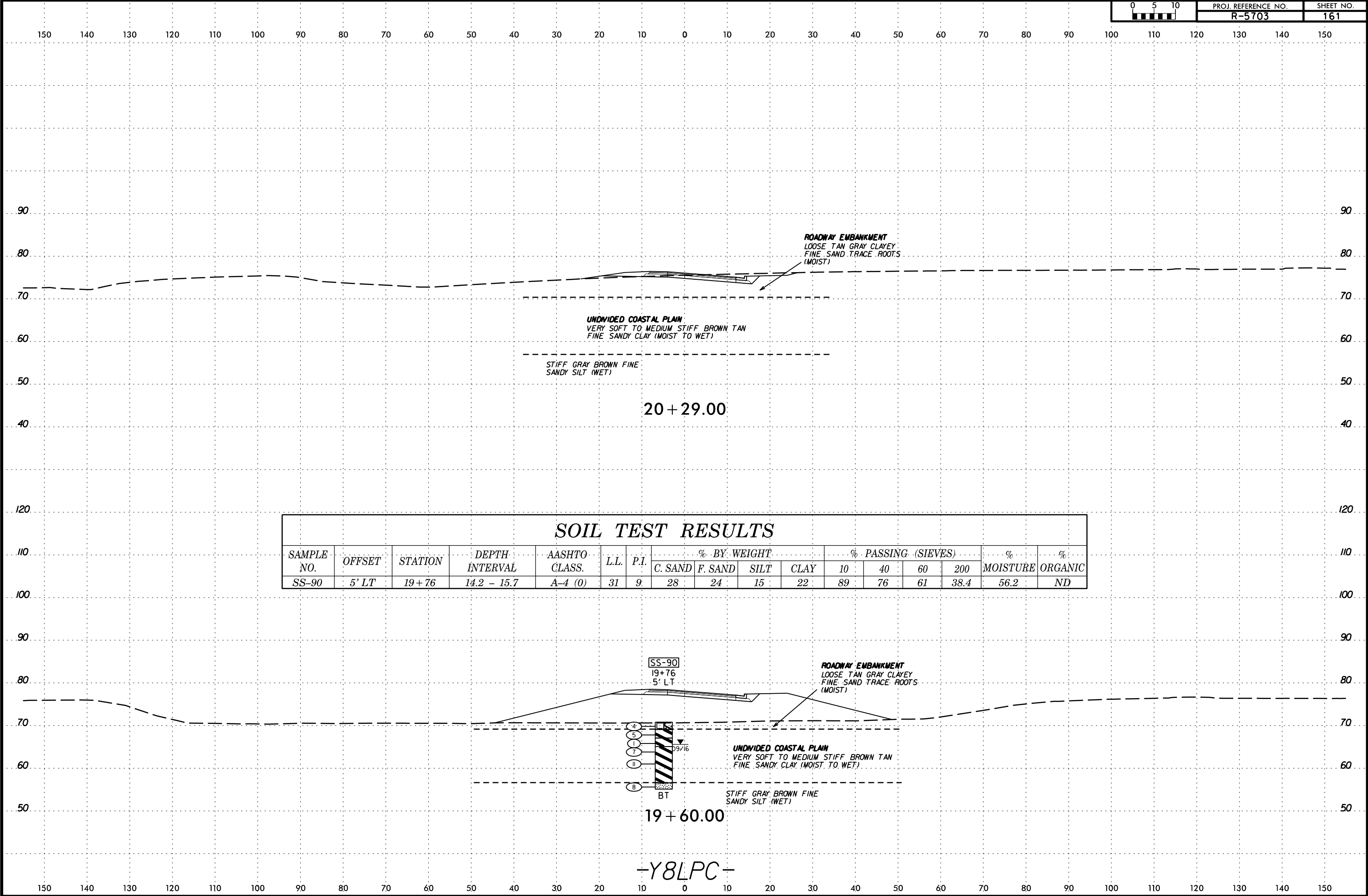


6/23/16



SS-100  
SS-101  
28+03  
35' LT  
BT  
06/17  
Y8RPB

6/23/16



6/23/16  
SS-90  
5' LT  
19+76  
BT  
D9/16  
UNDIVIDED COASTAL PLAIN  
VERY SOFT TO MEDIUM STIFF BROWN TAN  
FINE SANDY CLAY (MOIST TO WET)  
STIFF GRAY BROWN FINE  
SANDY SILT (WET)  
ROADWAY EMBANKMENT  
LOOSE TAN GRAY CLAYEY  
FINE SAND TRACE ROOTS  
(MOIST)

6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
162

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

90 80 70 60 50 90 80 70 60 50 90 80 70 60 50 90 80 70 60 50

SP  
50

6.19:1

UNDIVIDED COASTAL PLAIN  
VERY SOFT TO MEDIUM STIFF BROWN TAN  
FINE SANDY CLAY (MOIST TO WET)

21+59.00

ROADWAY EMBANKMENT  
LOOSE TAN GRAY CLAYEY  
FINE SAND TRACE ROOTS  
(MOIST)

UNDIVIDED COASTAL PLAIN  
VERY SOFT TO MEDIUM STIFF BROWN TAN  
FINE SANDY CLAY (MOIST TO WET)

STIFF GRAY BROWN FINE  
SANDY SILT (WET)

21+17.00

ROADWAY EMBANKMENT  
LOOSE TAN GRAY CLAYEY  
FINE SAND TRACE ROOTS  
(MOIST)

UNDIVIDED COASTAL PLAIN  
VERY SOFT TO MEDIUM STIFF BROWN TAN  
FINE SANDY CLAY (MOIST TO WET)

STIFF GRAY BROWN FINE  
SANDY SILT (WET)

20+72.00

-Y8LPC-

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

SECTION  
SURNAME



150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

110

100

90

80

70

60

90

80

70

60

110

100

90

80

70

60

90

80

70

60

UNDIVIDED COASTAL PLAIN  
VERY SOFT TO MEDIUM STIFF BROWN TAN  
FINE SANDY CLAY (MOIST TO WET)

22 + 51.89

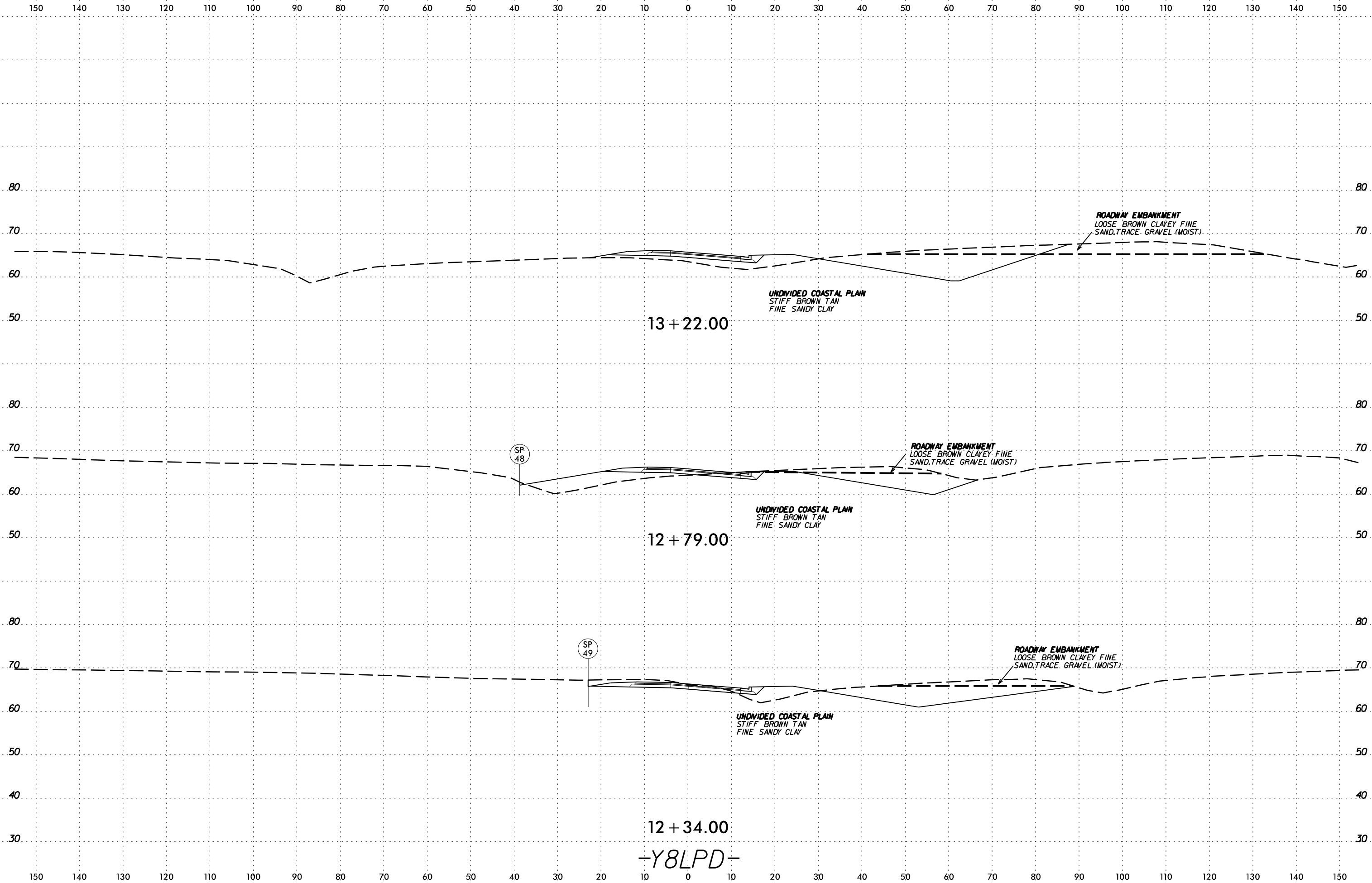
SP  
51

UNDIVIDED COASTAL PLAIN  
VERY SOFT TO MEDIUM STIFF BROWN TAN  
FINE SANDY CLAY (MOIST TO WET)

22 + 05.00

-Y8LPC-

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

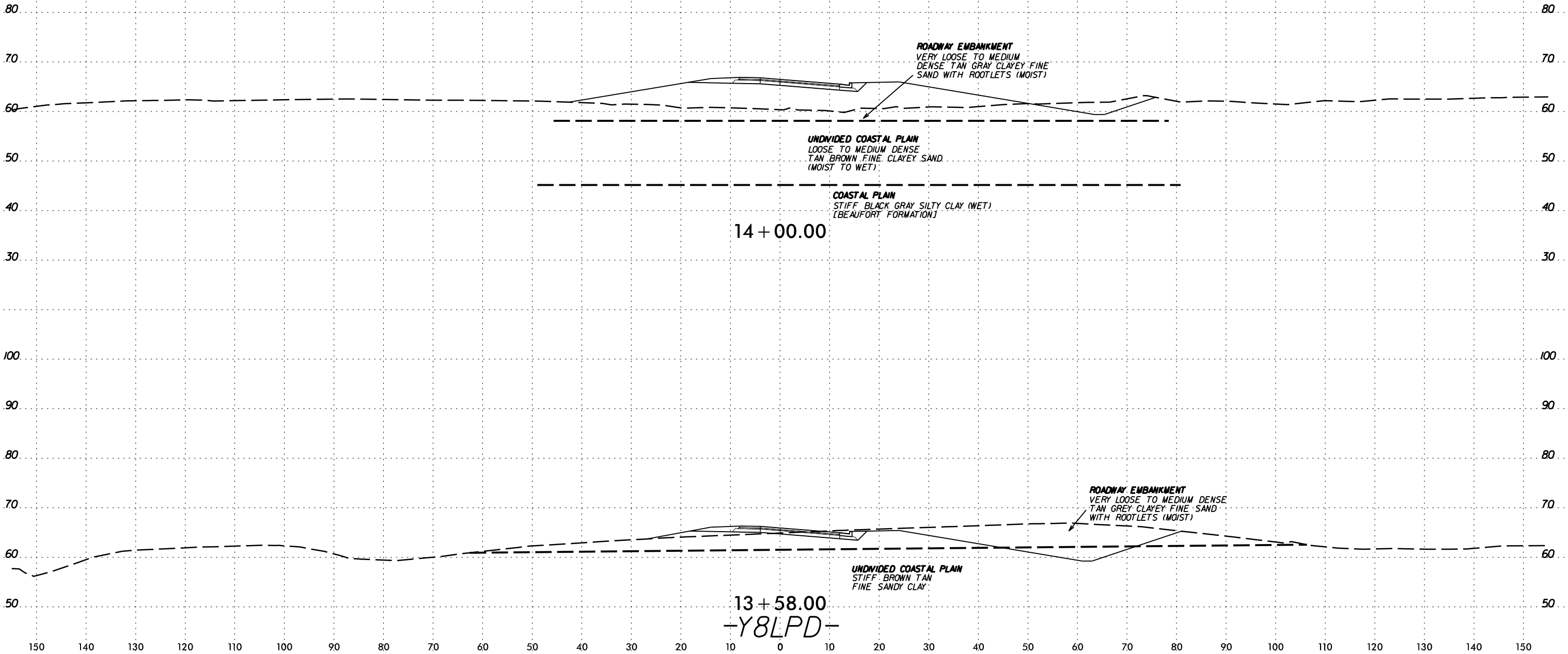




PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
165

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



ROADWAY EMBANKMENT  
VERY LOOSE TO MEDIUM DENSE  
TAN GRAY CLAYEY FINE  
SAND WITH ROOTLETS (MOIST)

UNDIVIDED COASTAL PLAIN  
LOOSE TO MEDIUM DENSE  
TAN BROWN FINE CLAYEY SAND  
(MOIST TO WET)

COASTAL PLAIN  
STIFF BLACK GRAY SILTY CLAY (WET)  
[BEAUFORT FORMATION]

14 + 00.00

ROADWAY EMBANKMENT  
VERY LOOSE TO MEDIUM DENSE  
TAN GREY CLAYEY FINE SAND  
WITH ROOTLETS (MOIST)

UNDIVIDED COASTAL PLAIN  
STIFF BROWN TAN  
FINE SANDY CLAY

13 + 58.00  
-Y8LPD-



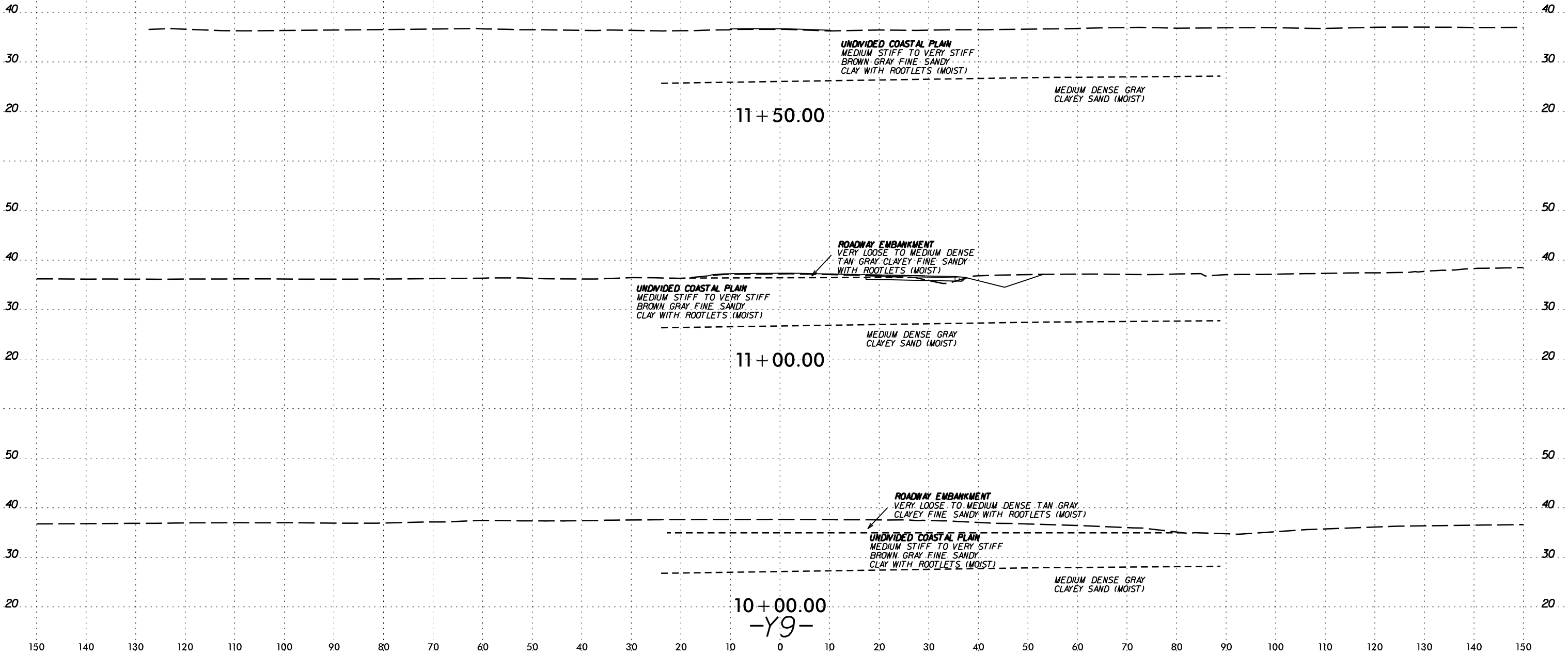
6/23/16



PROJ. REFERENCE NO.  
R-5703

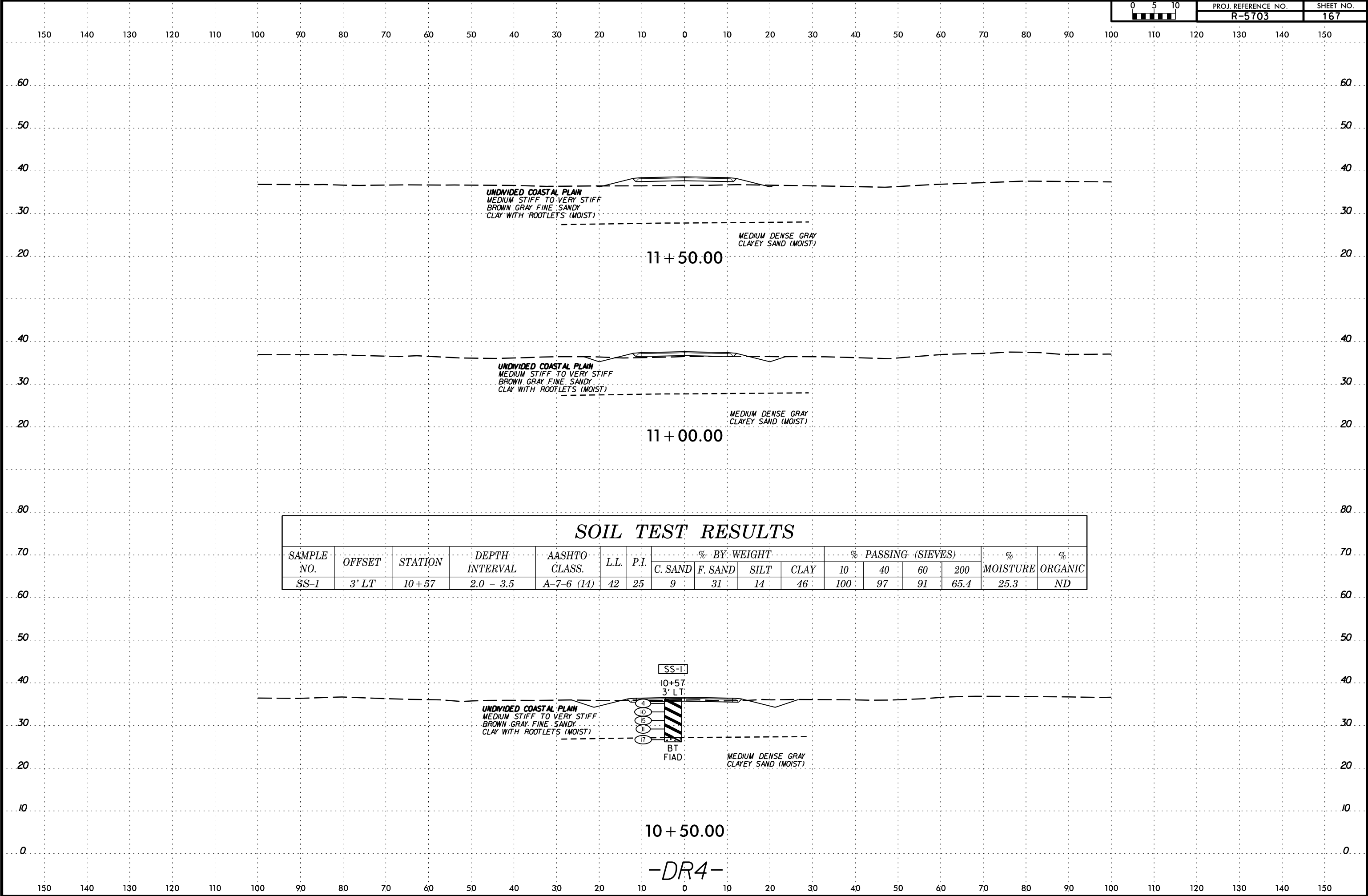
SHEET NO.  
166

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

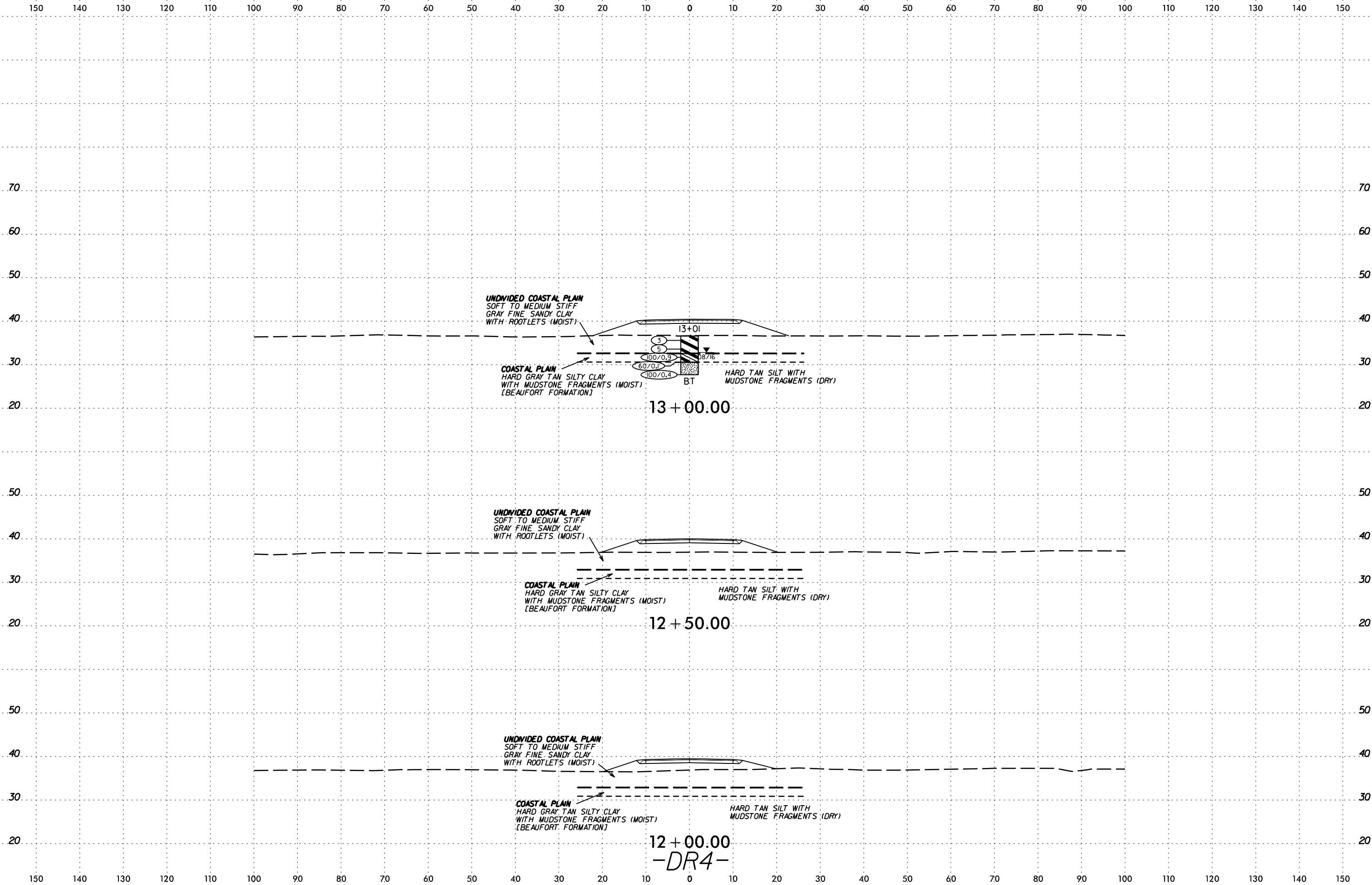


10+00.00  
-Y9-

6/23/16



SYTIME  
CON  
SUPERNAME



6/23/16



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-2	25' RT	15+97	2.0 - 3.5	A-7-6 (21)	50	26	6	15	21	58	95	93	89	77.8	32.6	ND

UNDIVIDED COASTAL PLAIN  
SOFT TO VERY STIFF  
BROWN GRAY FINE SANDY  
CLAY WITH ROOTLETS (MOIST)

HARD BLACK CLAY WITH  
MUDSTONE FRAGMENTS (DRY)  
[BEAUFORT FORMATION]

SS-2

15+97  
25' RT

2  
9  
13  
44  
69

BT

COASTAL PLAIN  
DENSE TAN GRAY SILTY SAND  
WITH MUDSTONE FRAGMENTS (MOIST)  
[BEAUFORT FORMATION]

16 + 00.00

UNDIVIDED COASTAL PLAIN  
SOFT TO VERY STIFF  
BROWN GRAY FINE SANDY  
CLAY WITH ROOTLETS (MOIST)

HARD BLACK CLAY WITH  
MUDSTONE FRAGMENTS (DRY)  
[BEAUFORT FORMATION]

COASTAL PLAIN  
DENSE TAN GRAY SILTY SAND  
WITH MUDSTONE FRAGMENTS (MOIST)  
[BEAUFORT FORMATION]

15 + 50.00

UNDIVIDED COASTAL PLAIN  
SOFT TO MEDIUM STIFF  
GRAY FINE SANDY CLAY  
WITH ROOTLETS (MOIST)

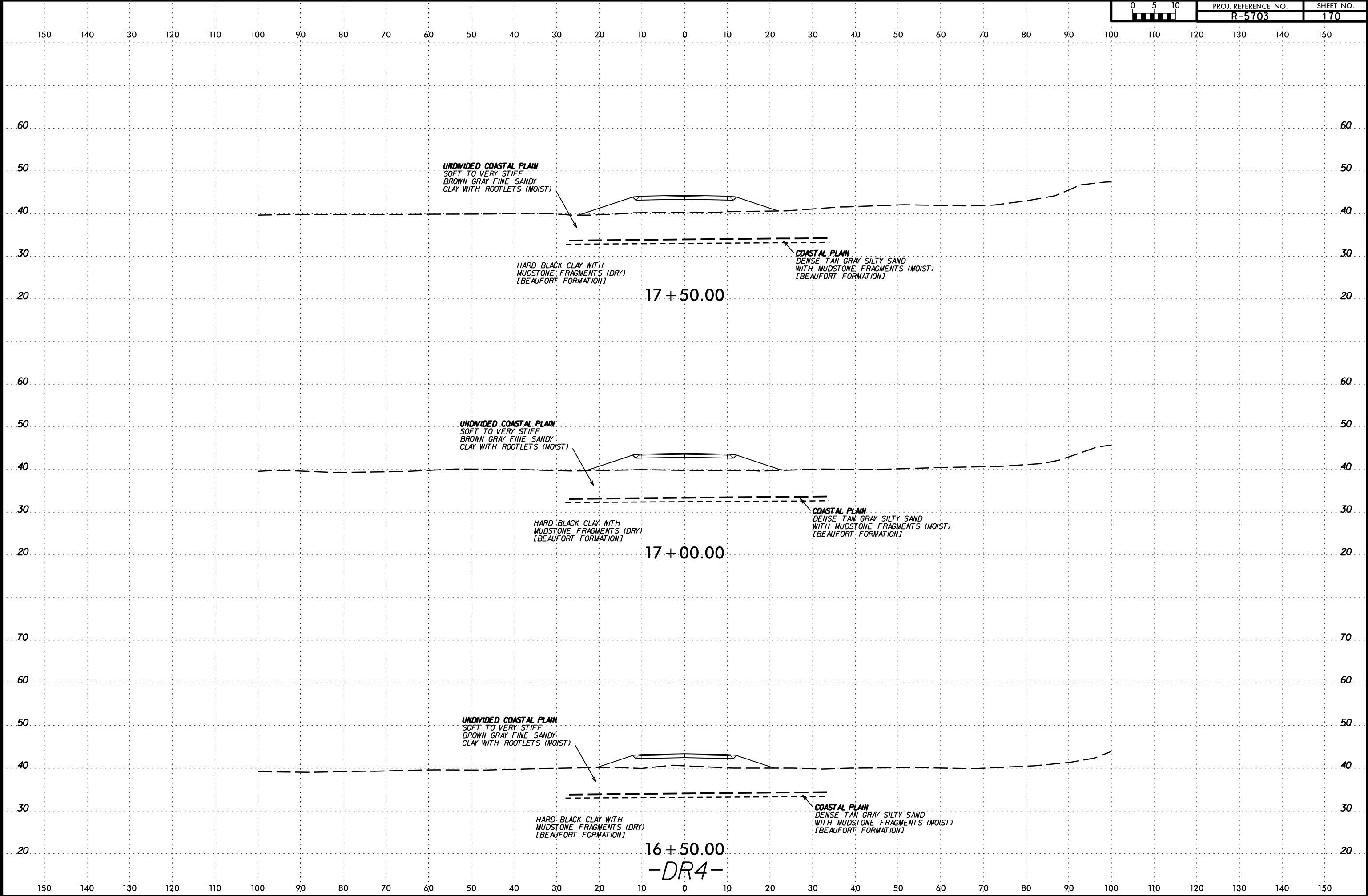
COASTAL PLAIN  
HARD GRAY TAN SILTY CLAY  
WITH MUDSTONE FRAGMENTS (MOIST)  
[BEAUFORT FORMATION]

HARD TAN SILT WITH  
MUDSTONE FRAGMENTS (DRY)

13 + 50.00

-DR4-

SYTIME  
SYSDOWN  
SYSSURNAME



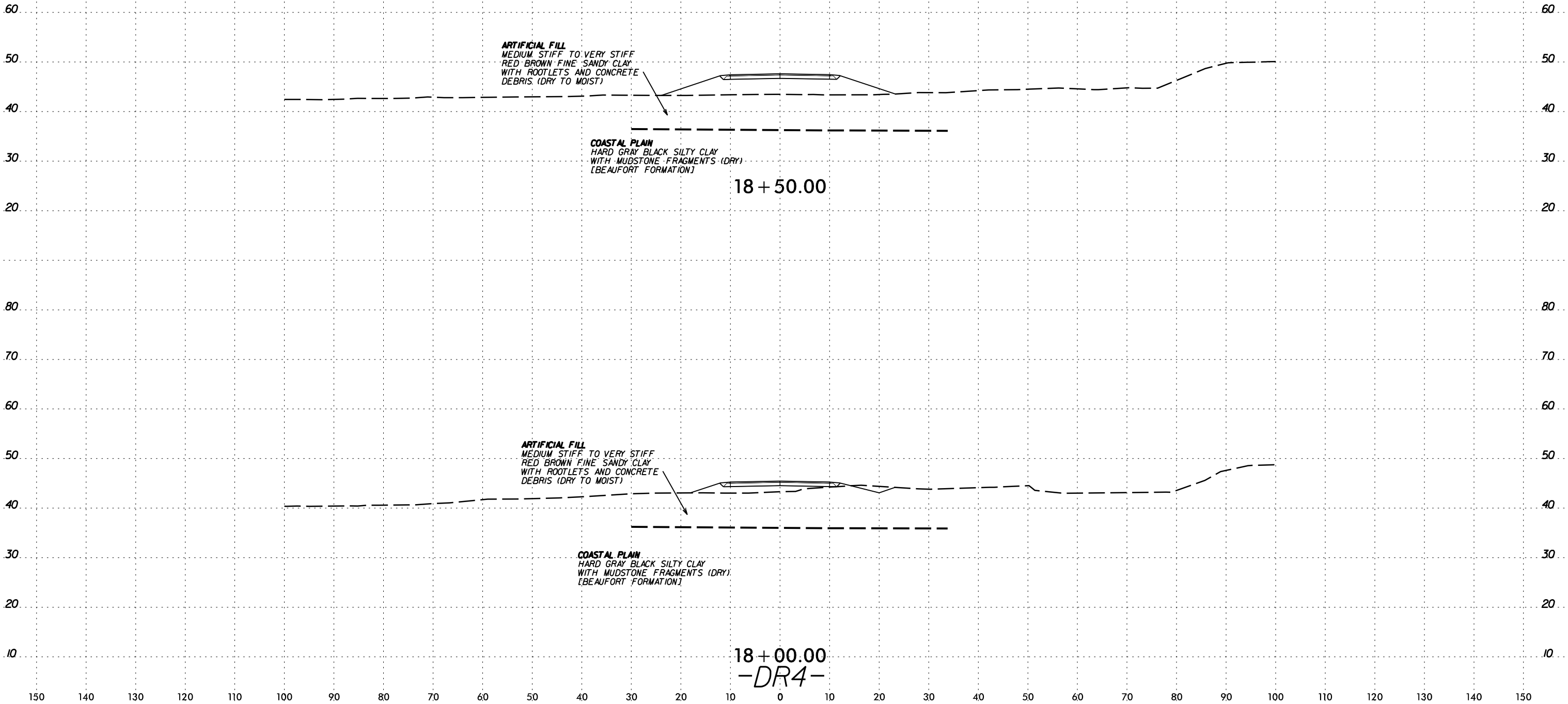
6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
171

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



ARTIFICIAL FILL  
MEDIUM STIFF TO VERY STIFF  
RED BROWN FINE SANDY CLAY  
WITH ROOTLETS AND CONCRETE  
DEBRIS (DRY TO MOIST)

COASTAL PLAIN  
HARD GRAY BLACK SILTY CLAY  
WITH MUDSTONE FRAGMENTS (DRY)  
[BEAUFORT FORMATION]

18 + 50.00

ARTIFICIAL FILL  
MEDIUM STIFF TO VERY STIFF  
RED BROWN FINE SANDY CLAY  
WITH ROOTLETS AND CONCRETE  
DEBRIS (DRY TO MOIST)

COASTAL PLAIN  
HARD GRAY BLACK SILTY CLAY  
WITH MUDSTONE FRAGMENTS (DRY)  
[BEAUFORT FORMATION]

18 + 00.00

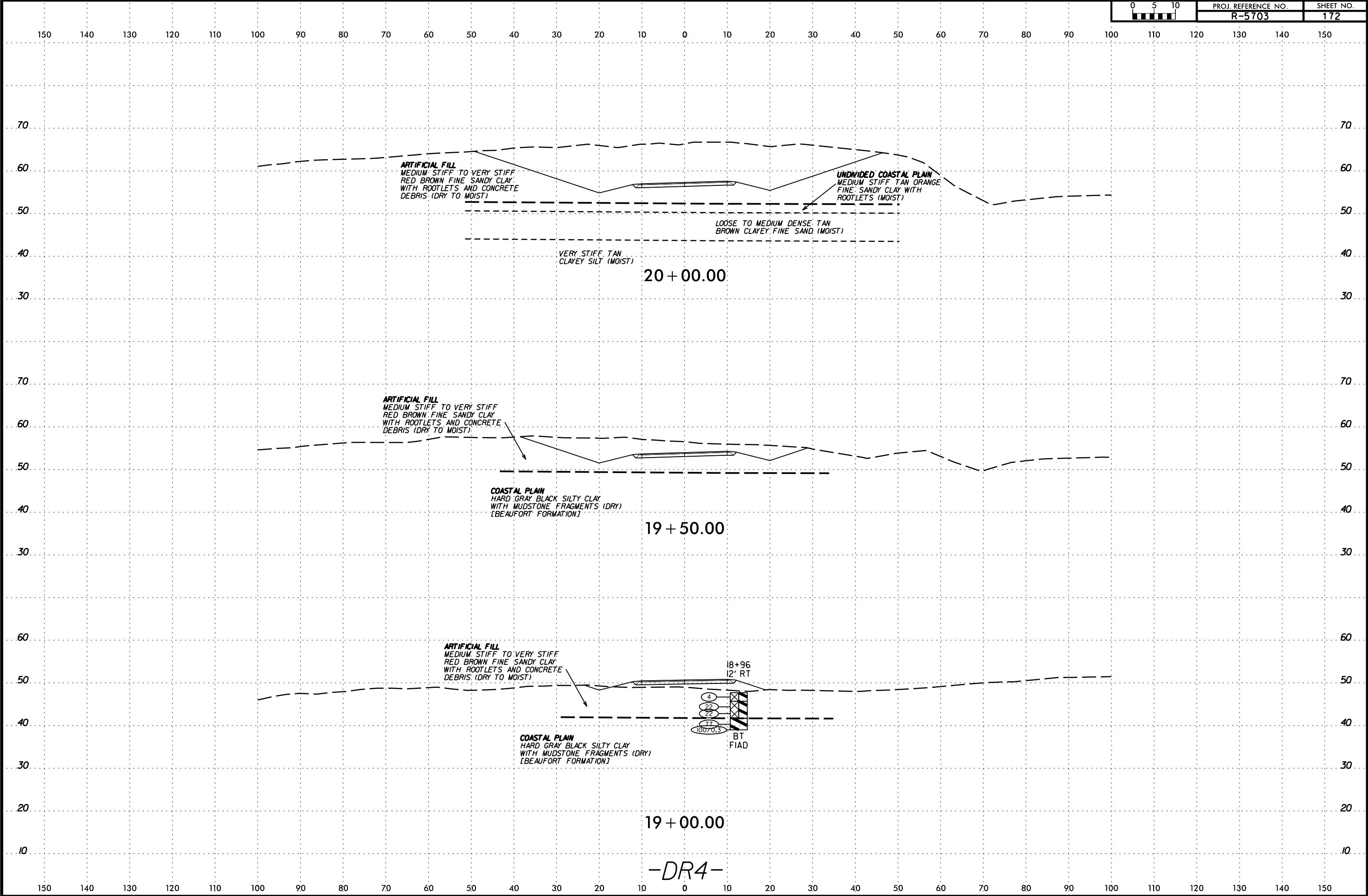
-DR4-

SYNTHETIC SECTION  
SURNAME

6/23/16

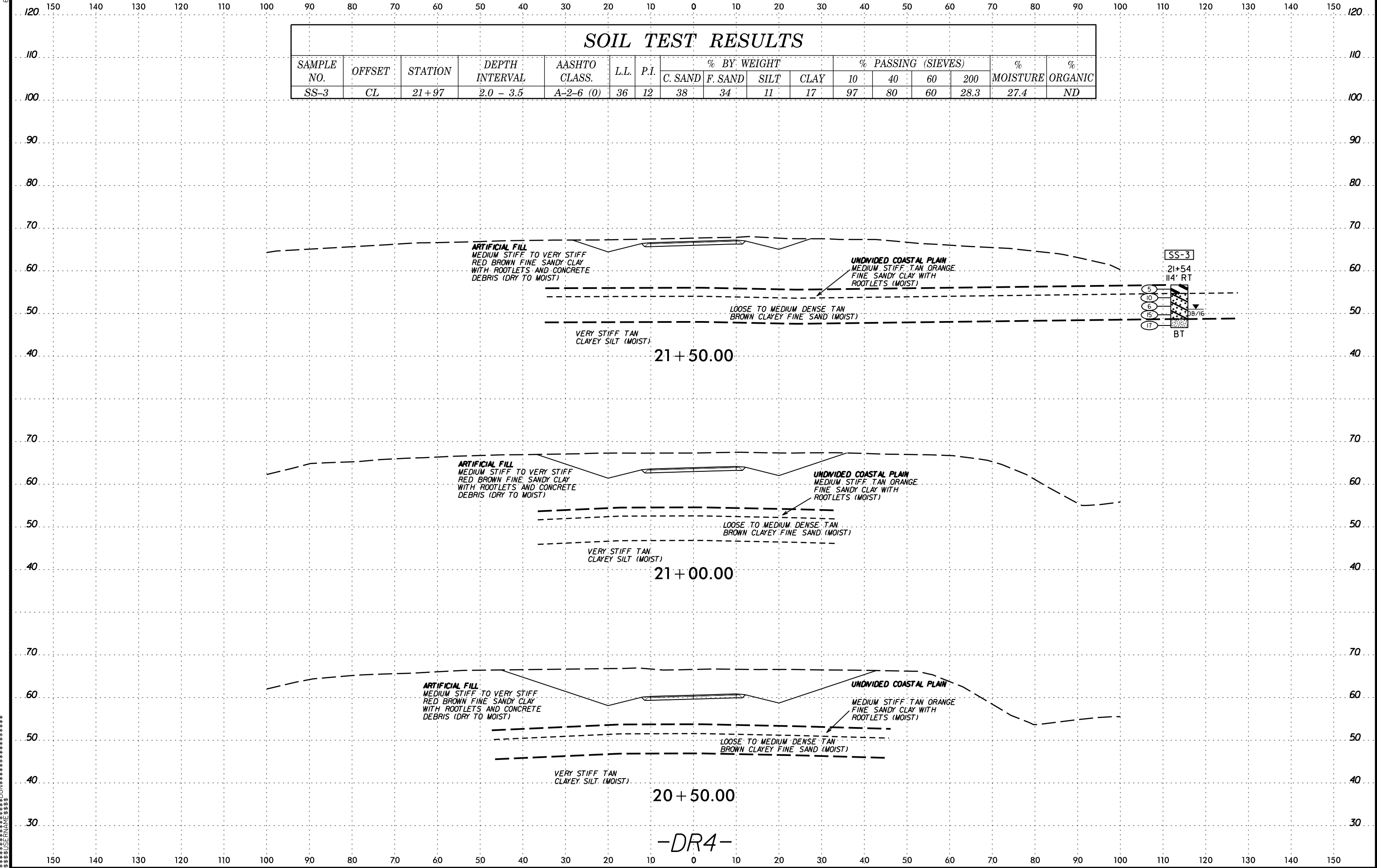


PROJ. REFERENCE NO.	SHEET NO.
R-5703	172



6/23/16

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-3	CL	21+97	2.0 - 3.5	A-2-6 (0)	36	12	38	34	11	17	97	80	60	28.3	27.4	ND





6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
174

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

100

90

80

70

60

50

40

100

90

80

70

60

50

40

ARTIFICIAL FILL  
MEDIUM STIFF TO VERY STIFF  
RED BROWN FINE SANDY CLAY  
WITH ROOTLETS AND CONCRETE  
DEBRIS (DRY TO MOIST)

UNDIVIDED COASTAL PLAIN  
MEDIUM STIFF TAN ORANGE  
FINE SANDY CLAY WITH  
ROOTLETS (MOIST)

LOOSE TO MEDIUM DENSE TAN  
BROWN CLAYEY FINE SAND (MOIST)

VERY STIFF TAN  
CLAYEY SILT (MOIST)

22+00.00  
-DR4-

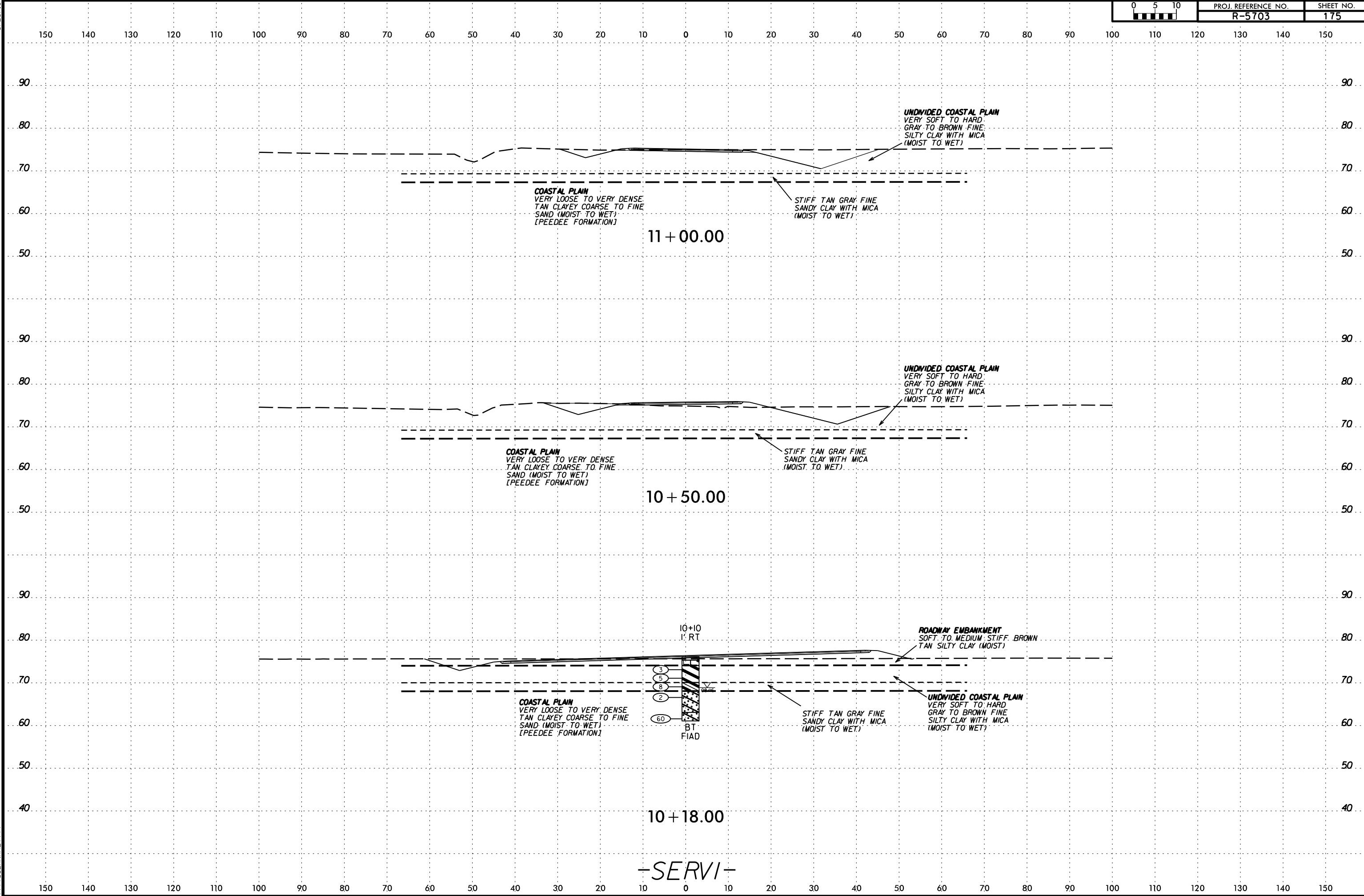
SYNTHETIC  
CONCRETE  
SURFACING

6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
175

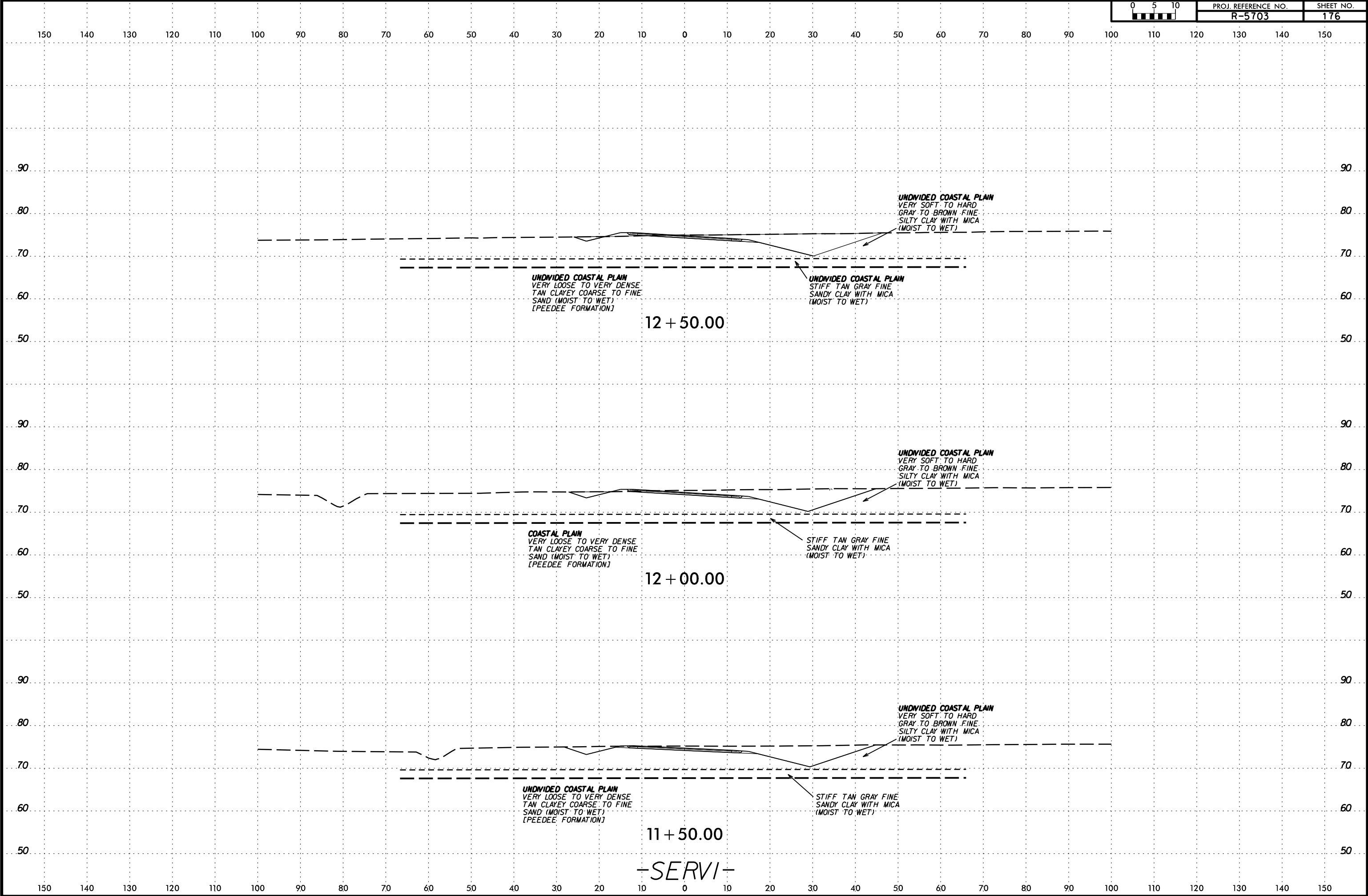


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
176



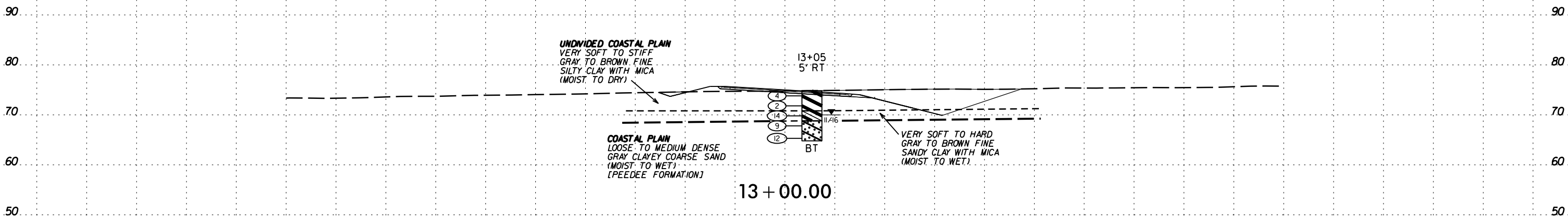
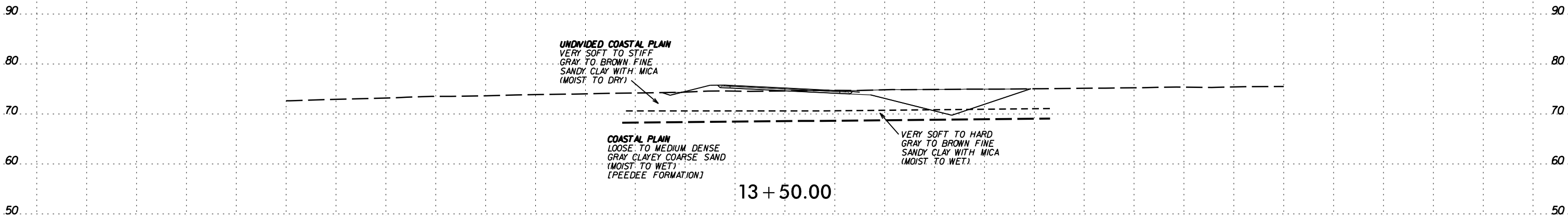
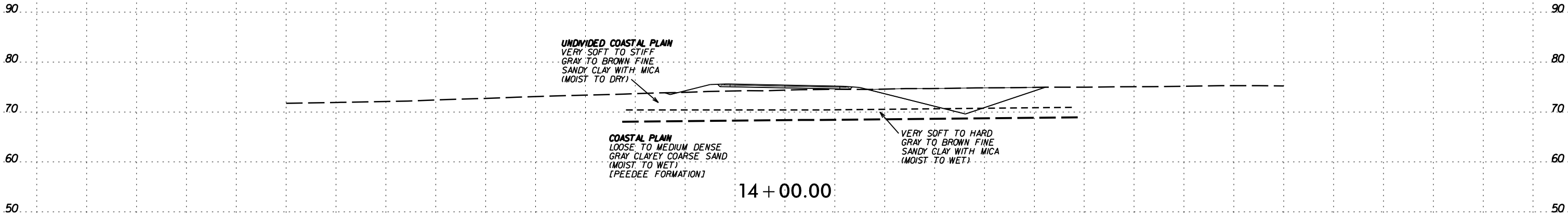
6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
177

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

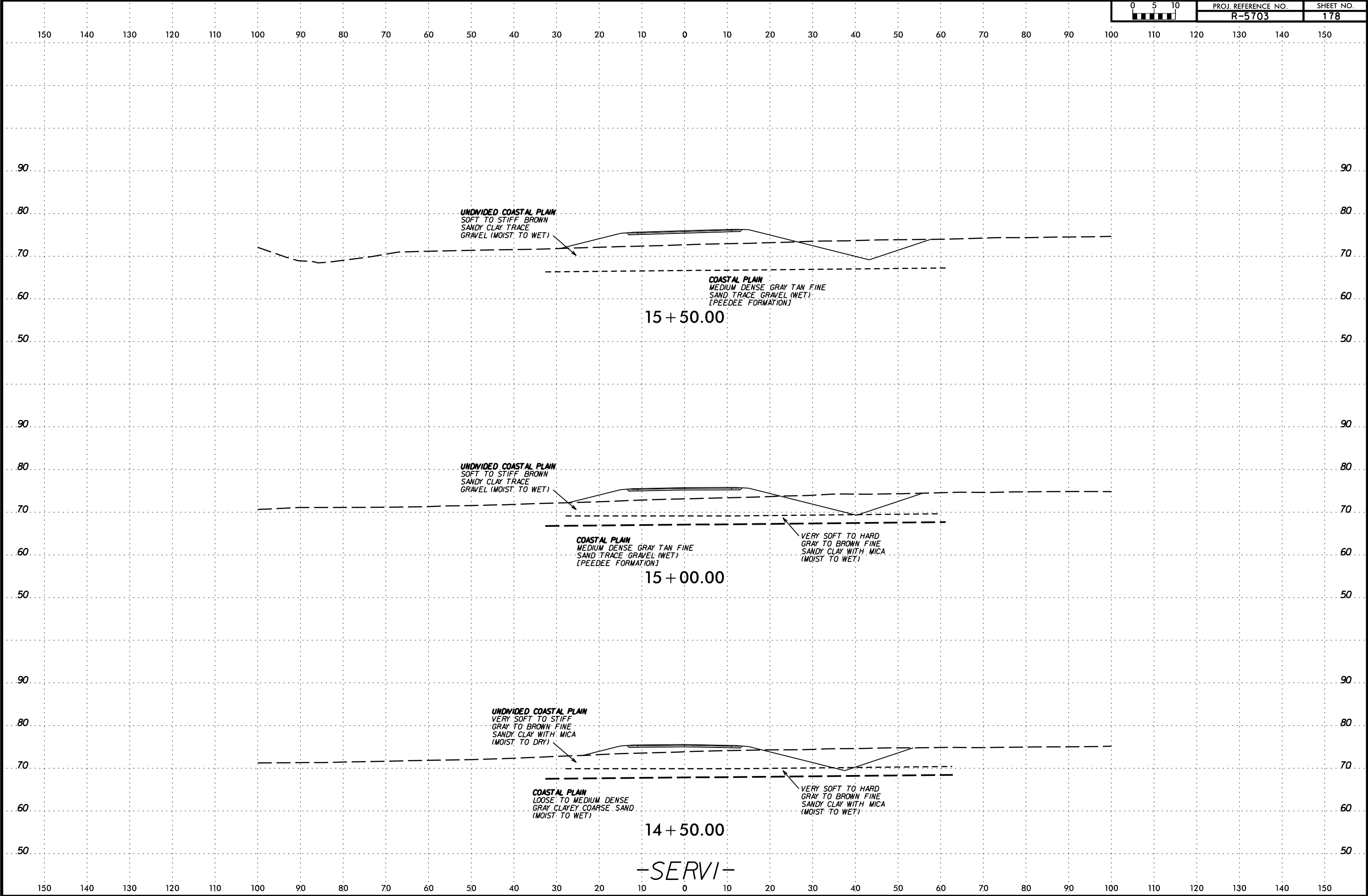
SYNOPSIS OF SOILS  
SUPERNAME

6/23/16

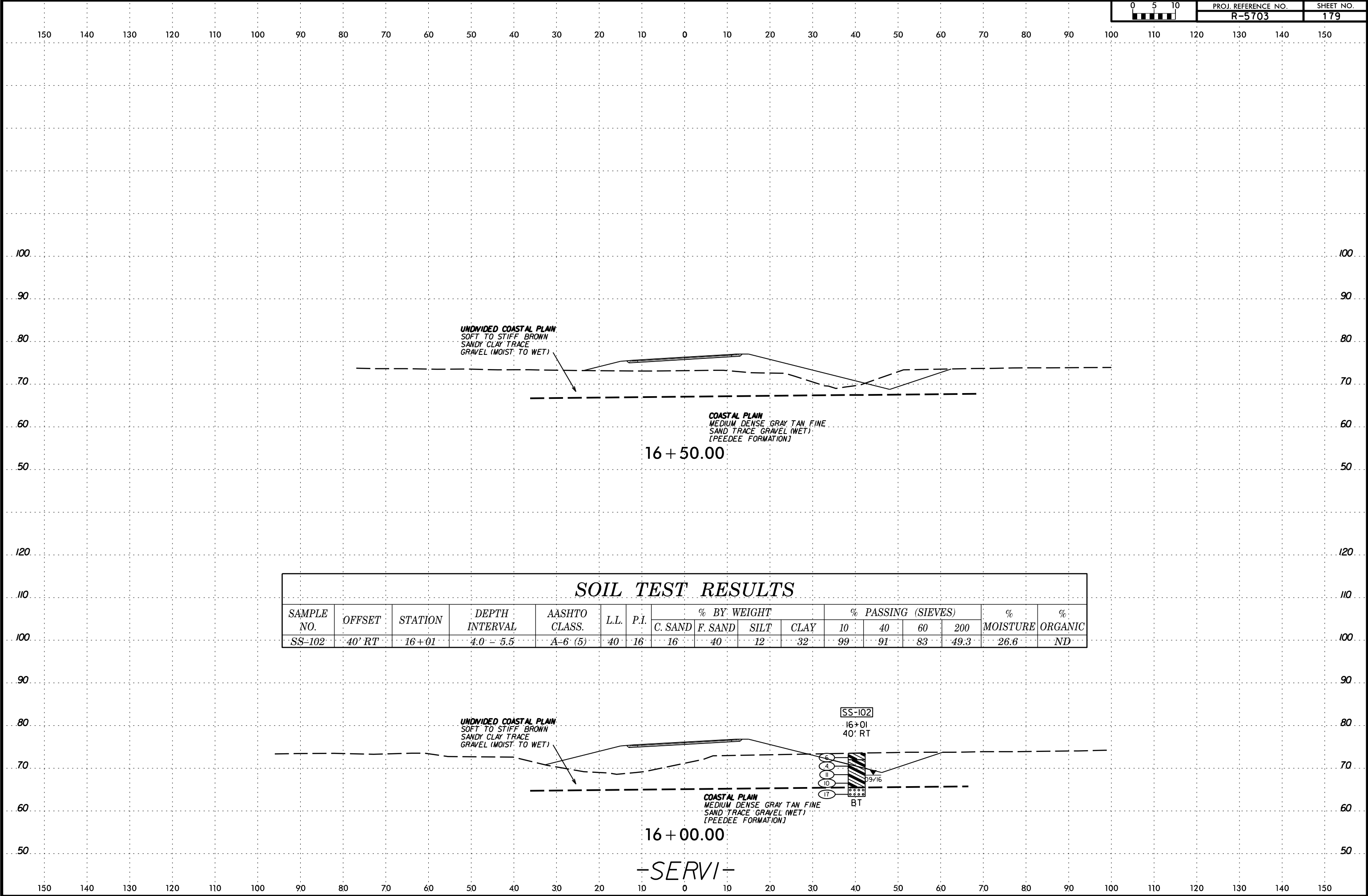


PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
178



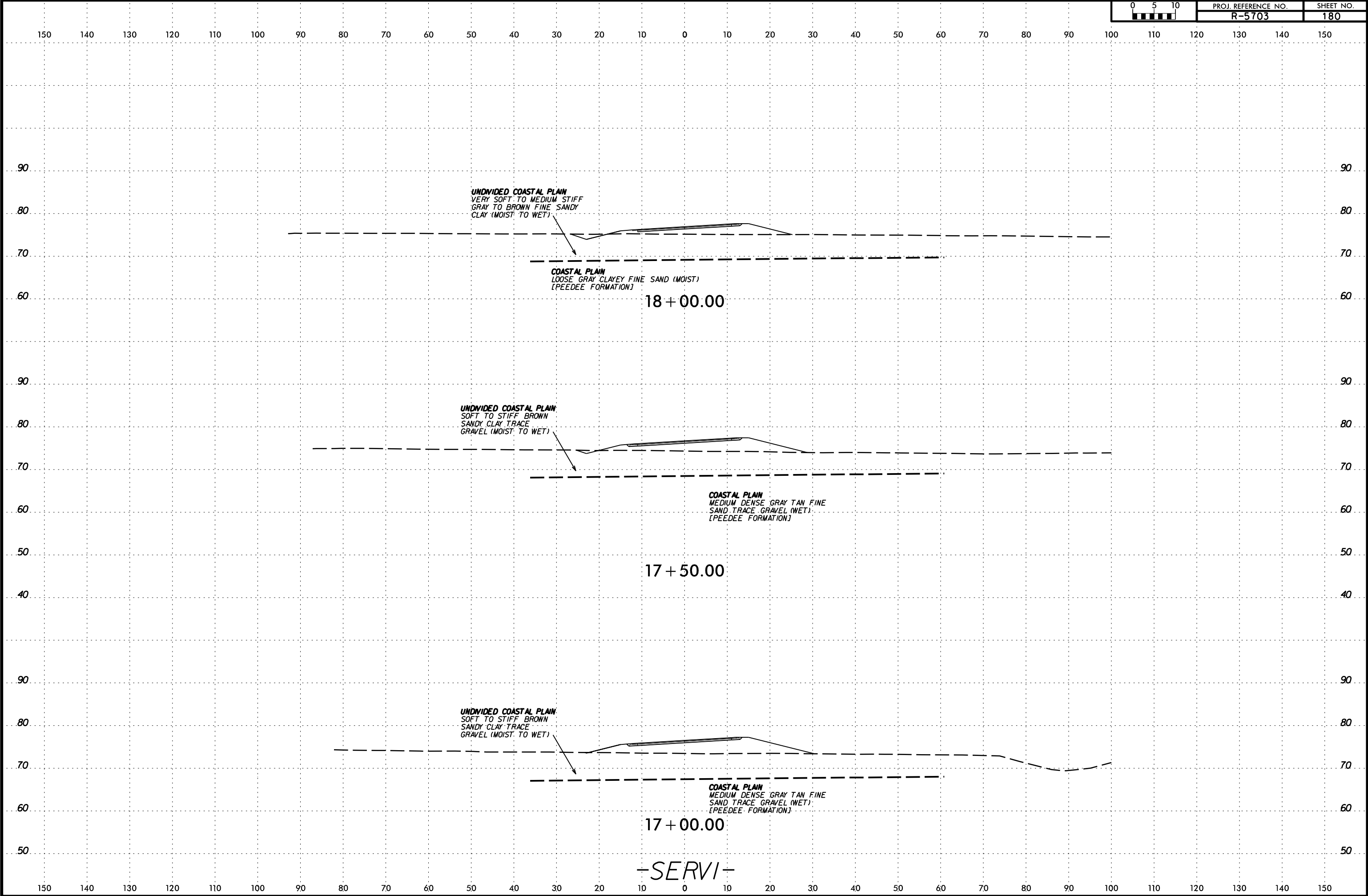
6/23/16

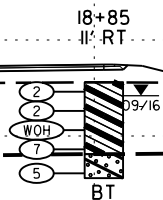


6/23/16  
SS-102  
40' RT  
16+01  
4.0 - 5.5  
A-6 (5)  
40  
16  
16  
40  
12  
32  
99  
91  
83  
49.3  
26.6  
ND



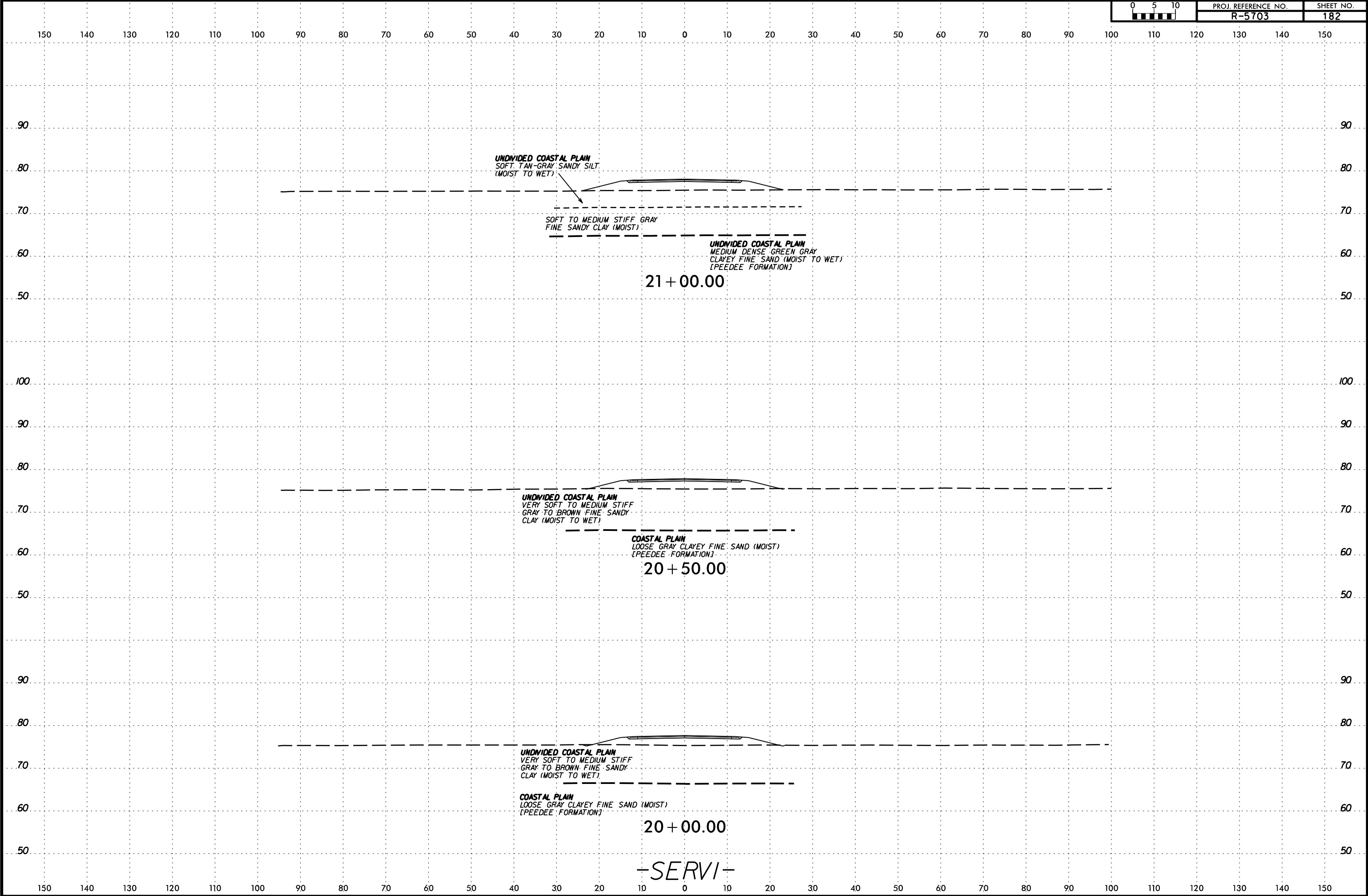
PROJ. REFERENCE NO.	SHEET NO.
R-5703	180



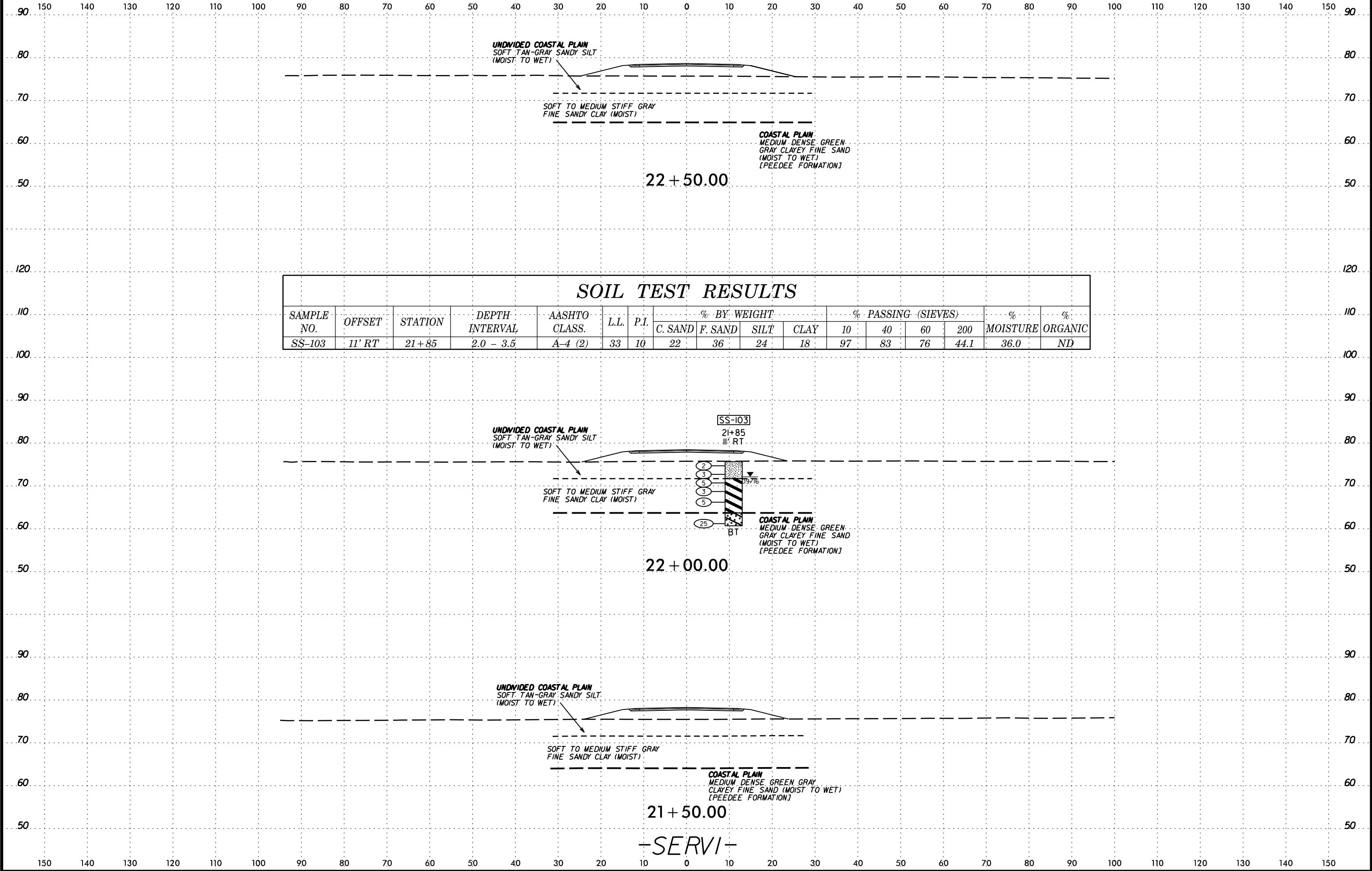


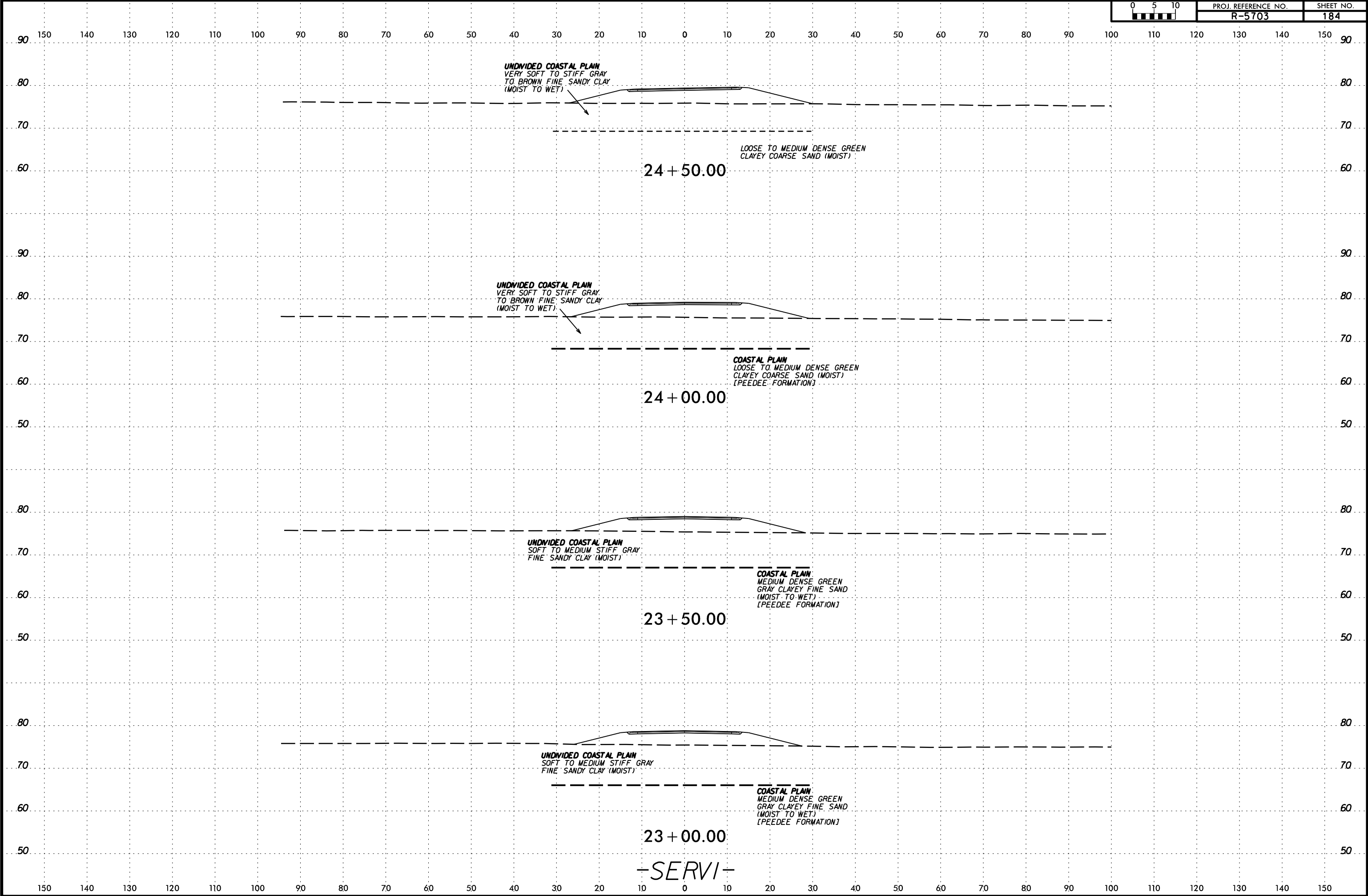
—SERVI—





6/23/16



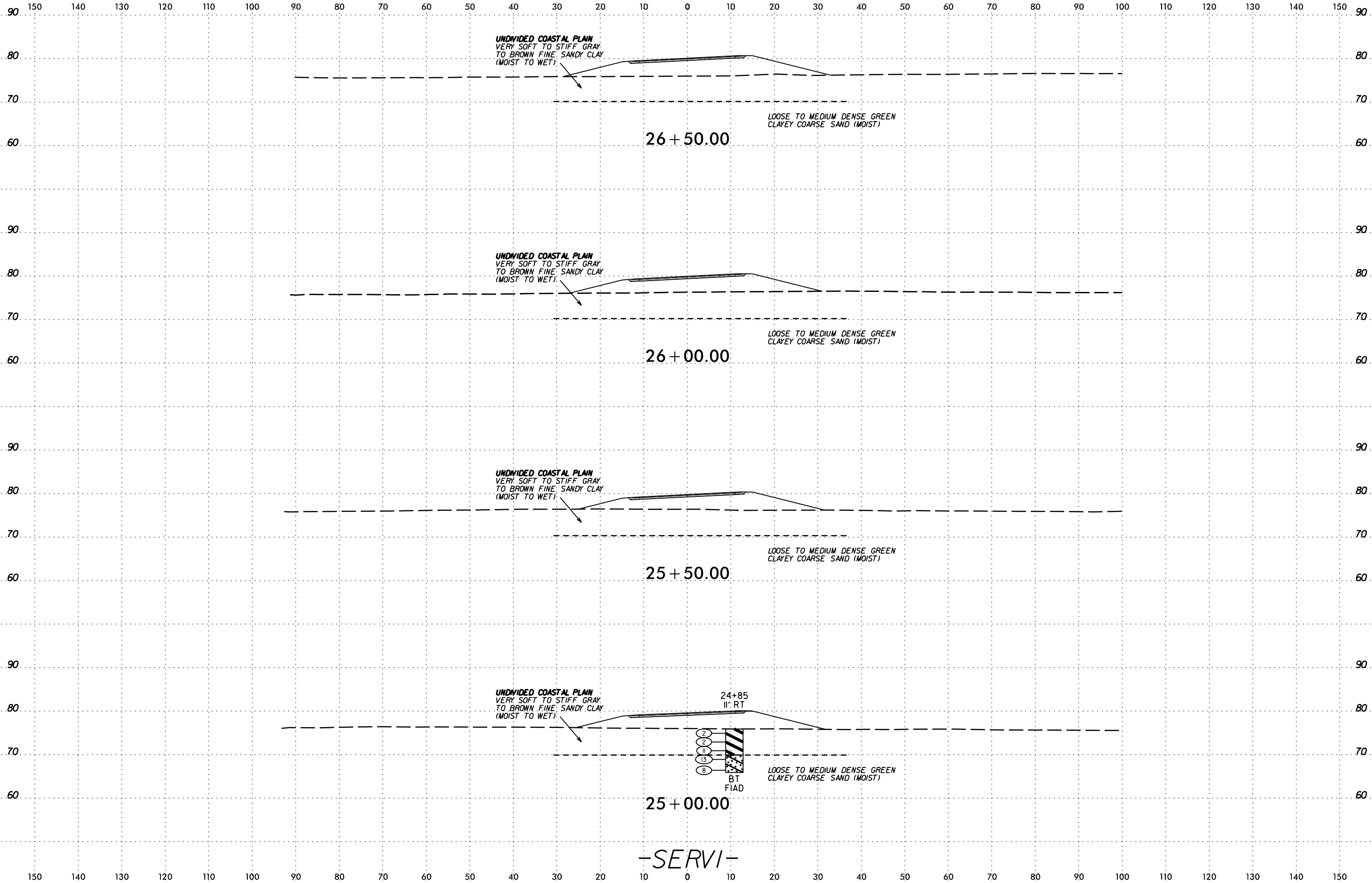


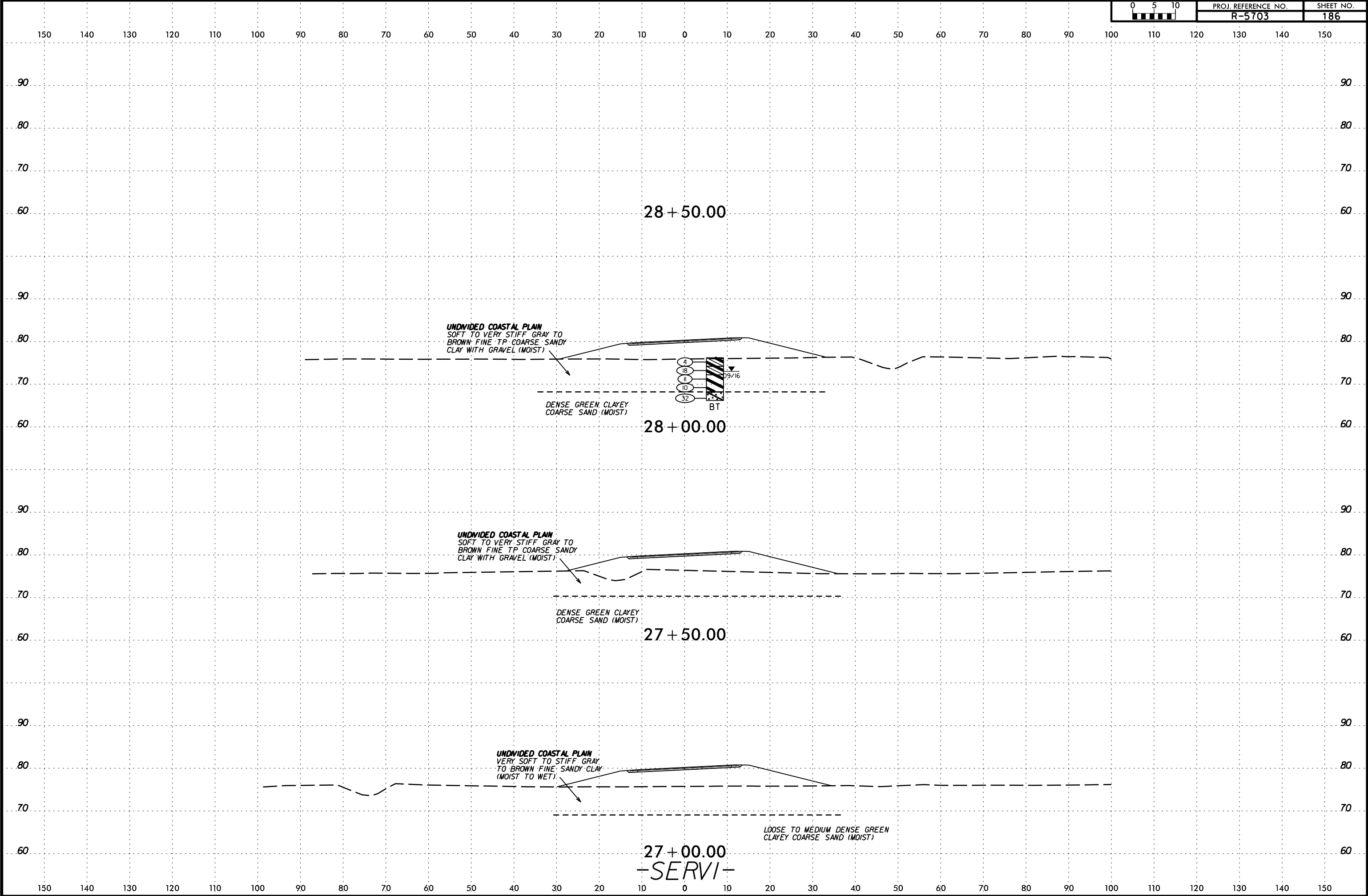
6/23/16

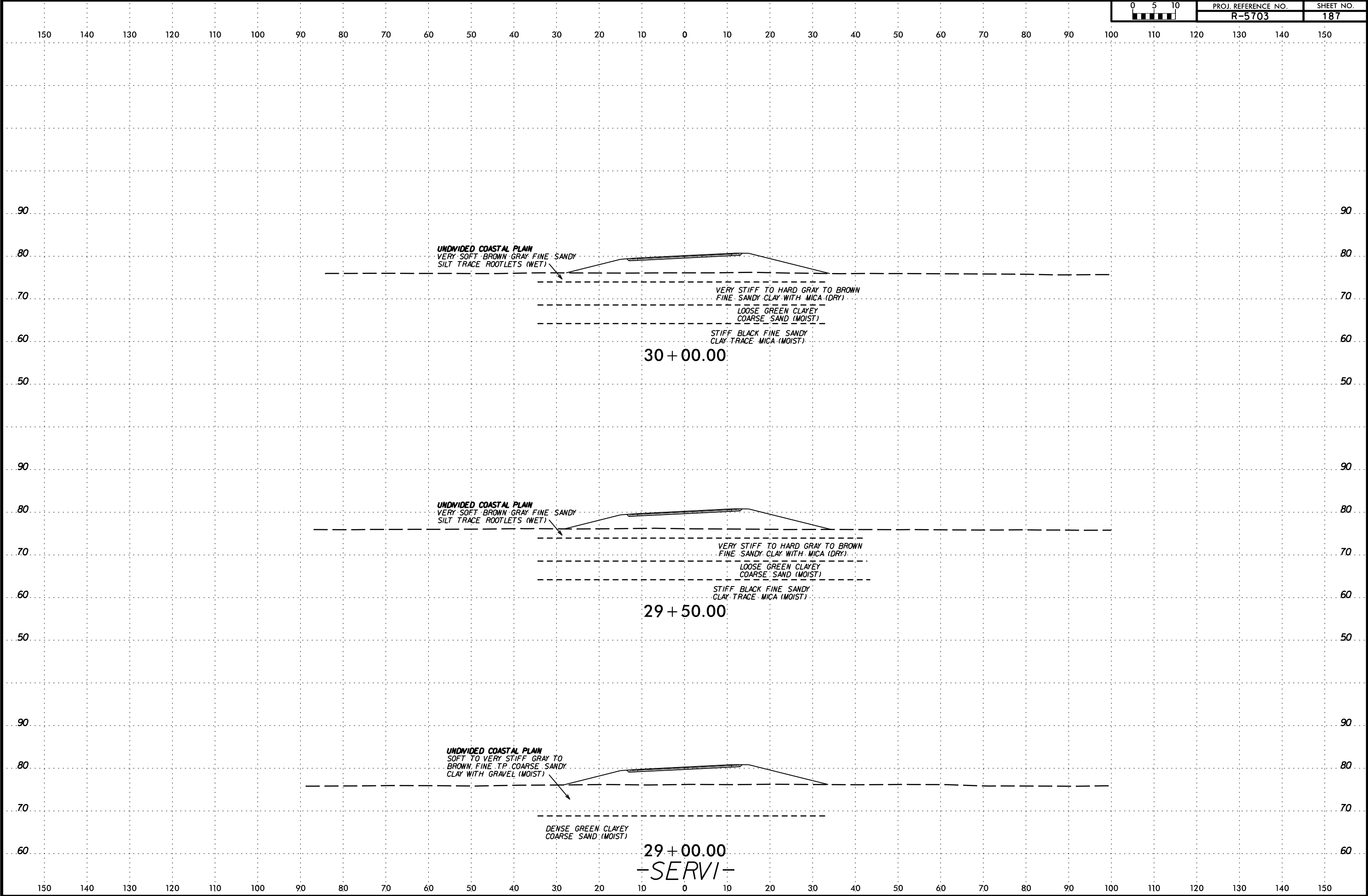


PROJ. REFERENCE NO.  
R-5703

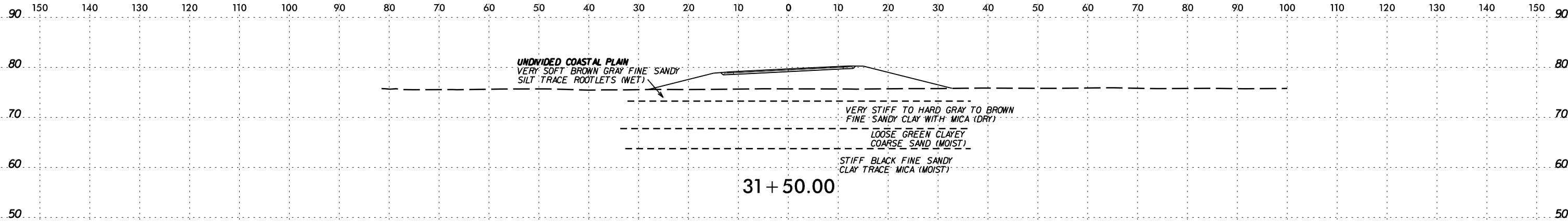
SHEET NO.  
185



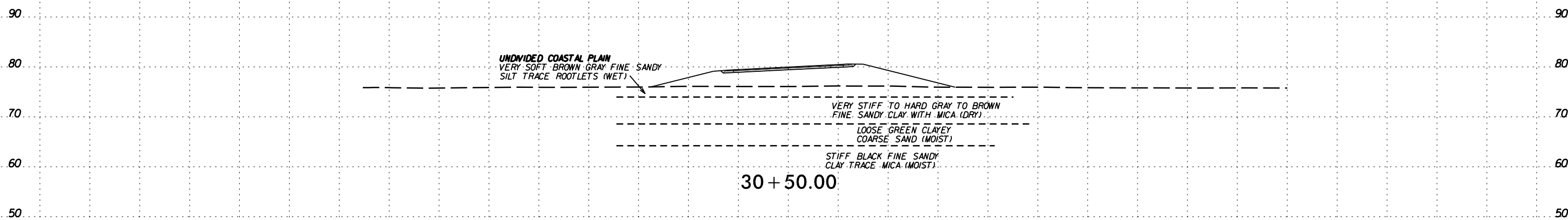
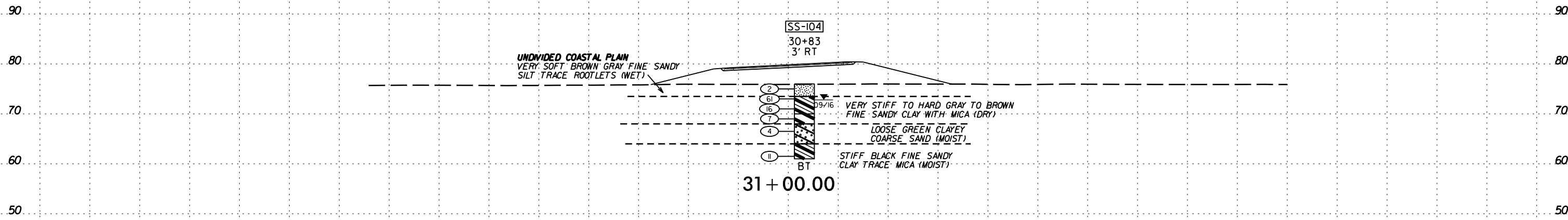




6/23/16



SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-104	3' RT	30+83	0.0 - 1.5	A-4 (0)	16	6	19	39	20	22	99	89	80	46.0	16.3	ND



6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	189

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

90

80

70

60

50

90

80

70

60

50

UNDIVIDED COASTAL PLAIN  
VERY SOFT BROWN GRAY FINE SANDY  
SILT TRACE ROOTLETS (WET)

VERY STIFF TO HARD GRAY TO BROWN  
FINE SANDY CLAY WITH MICA (DRY)

LOOSE GREEN CLAYEY  
COARSE SAND (MOIST)

STIFF BLACK FINE SANDY  
CLAY TRACE MICA (MOIST)

32 + 50.00

90

80

70

60

50

90

80

70

60

50

UNDIVIDED COASTAL PLAIN  
VERY SOFT BROWN GRAY FINE SANDY  
SILT TRACE ROOTLETS (WET)

VERY STIFF TO HARD GRAY TO BROWN  
FINE SANDY CLAY WITH MICA (DRY)

LOOSE GREEN CLAYEY  
COARSE SAND (MOIST)

STIFF BLACK FINE SANDY  
CLAY TRACE MICA (MOIST)

32 + 00.00

-SERVI-

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

6/23/16  
UNDIVIDED COASTAL PLAIN  
VERY SOFT BROWN GRAY FINE SANDY  
SILT TRACE ROOTLETS (WET)



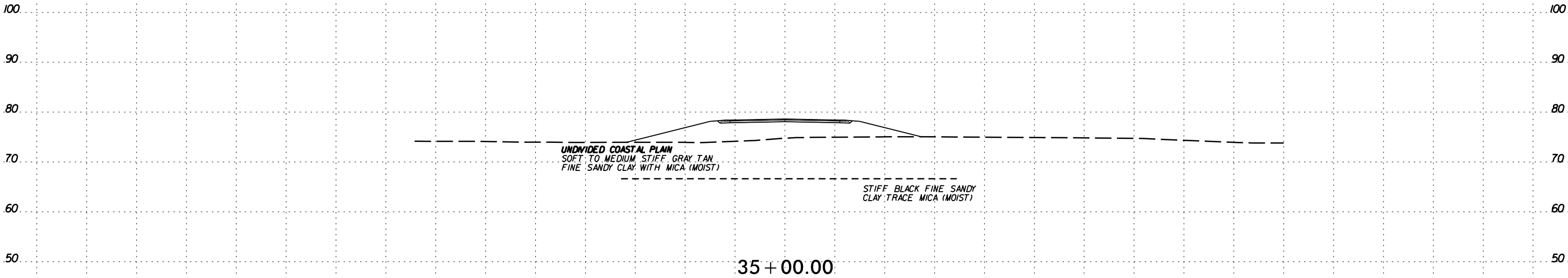
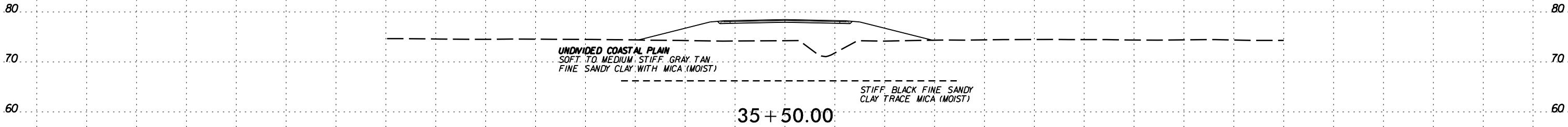


6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	191

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



-SERVI-

SECTION 35+00.00 TO 35+50.00  
SERVI

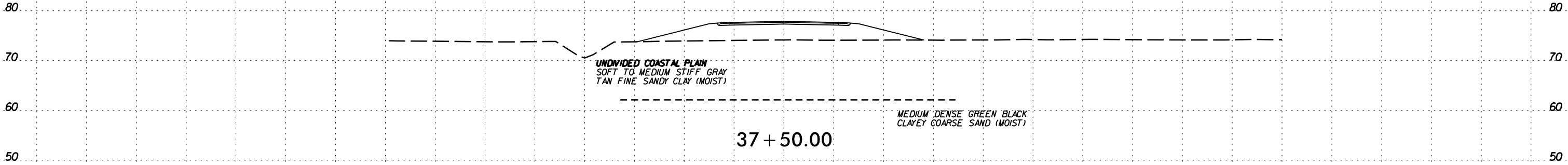
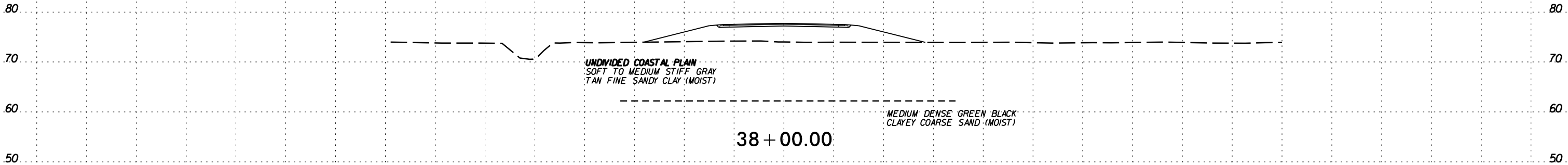
6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
192

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



-SERVI-

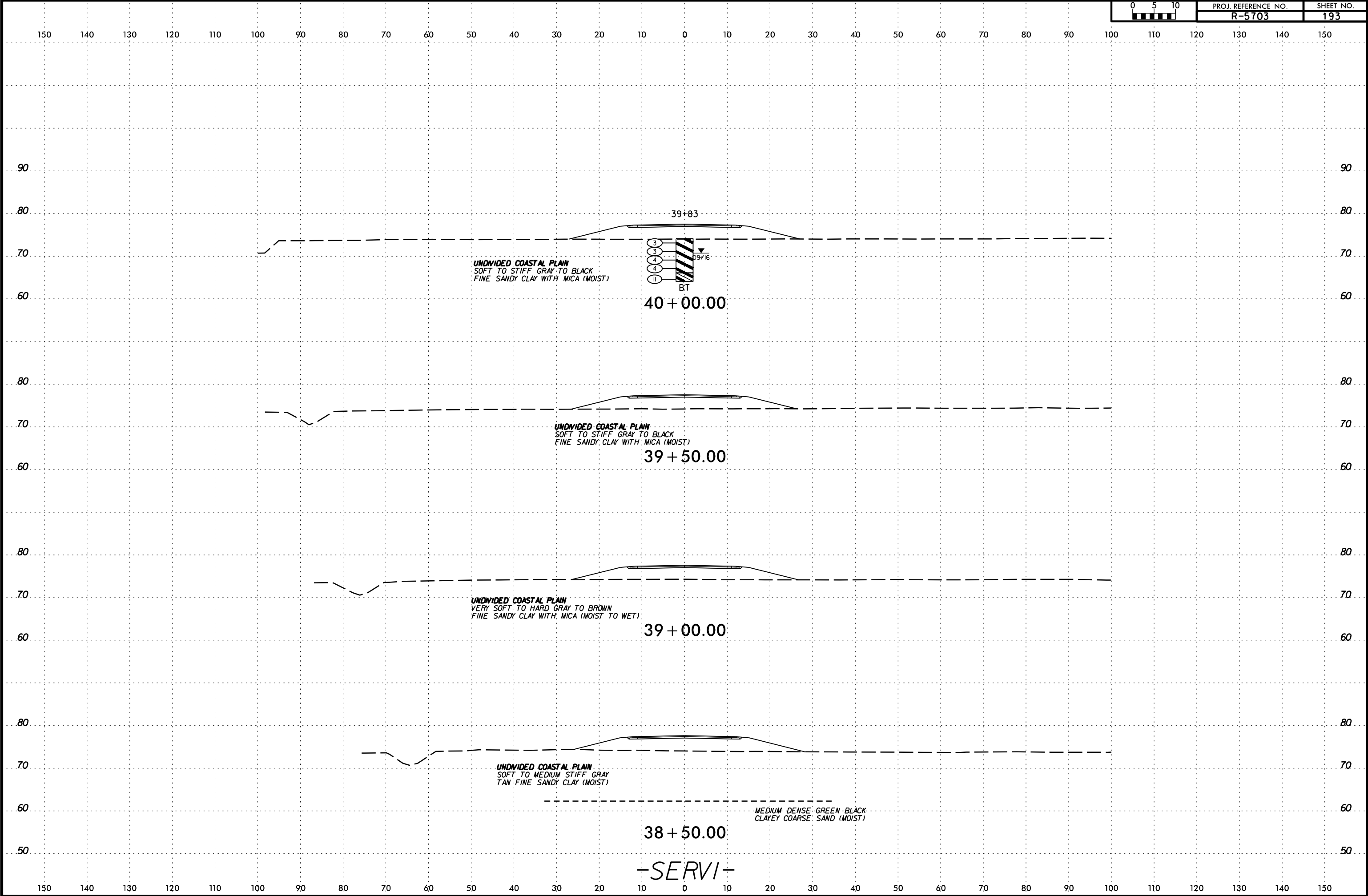
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

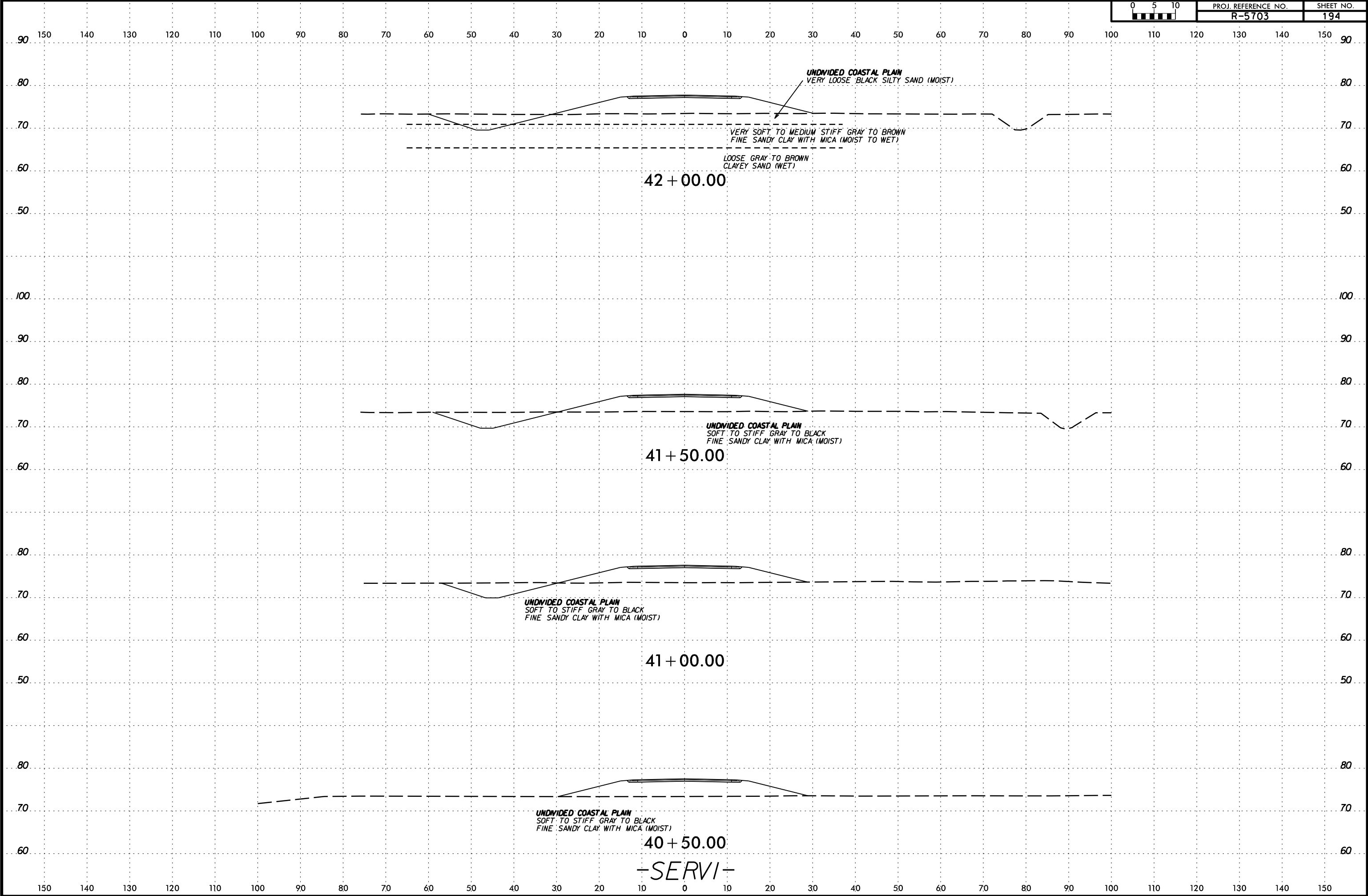
SYNOPSIS OF CONDITIONS  
AS SHOWN ON SHEET 192

6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	193



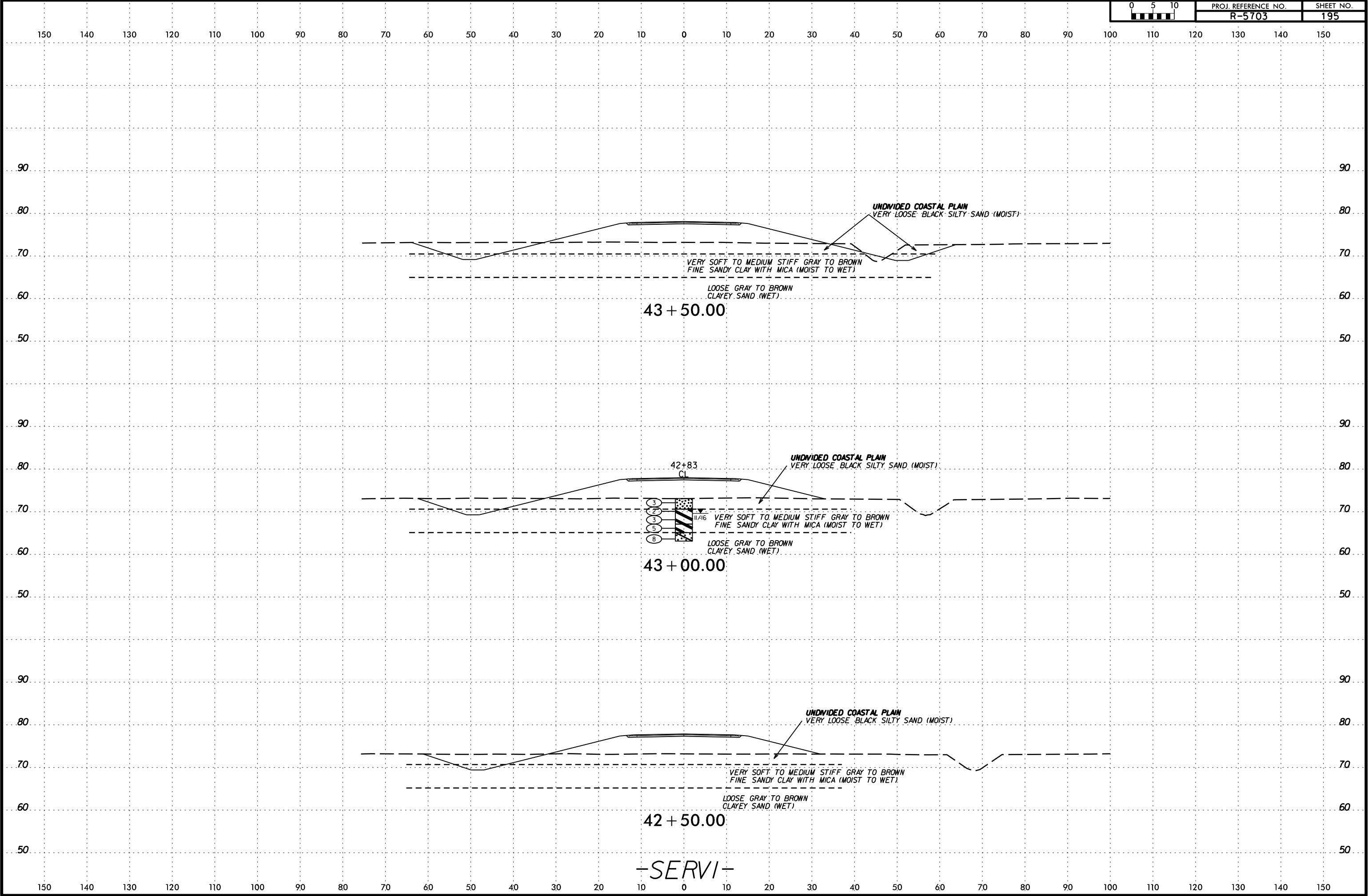


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
195

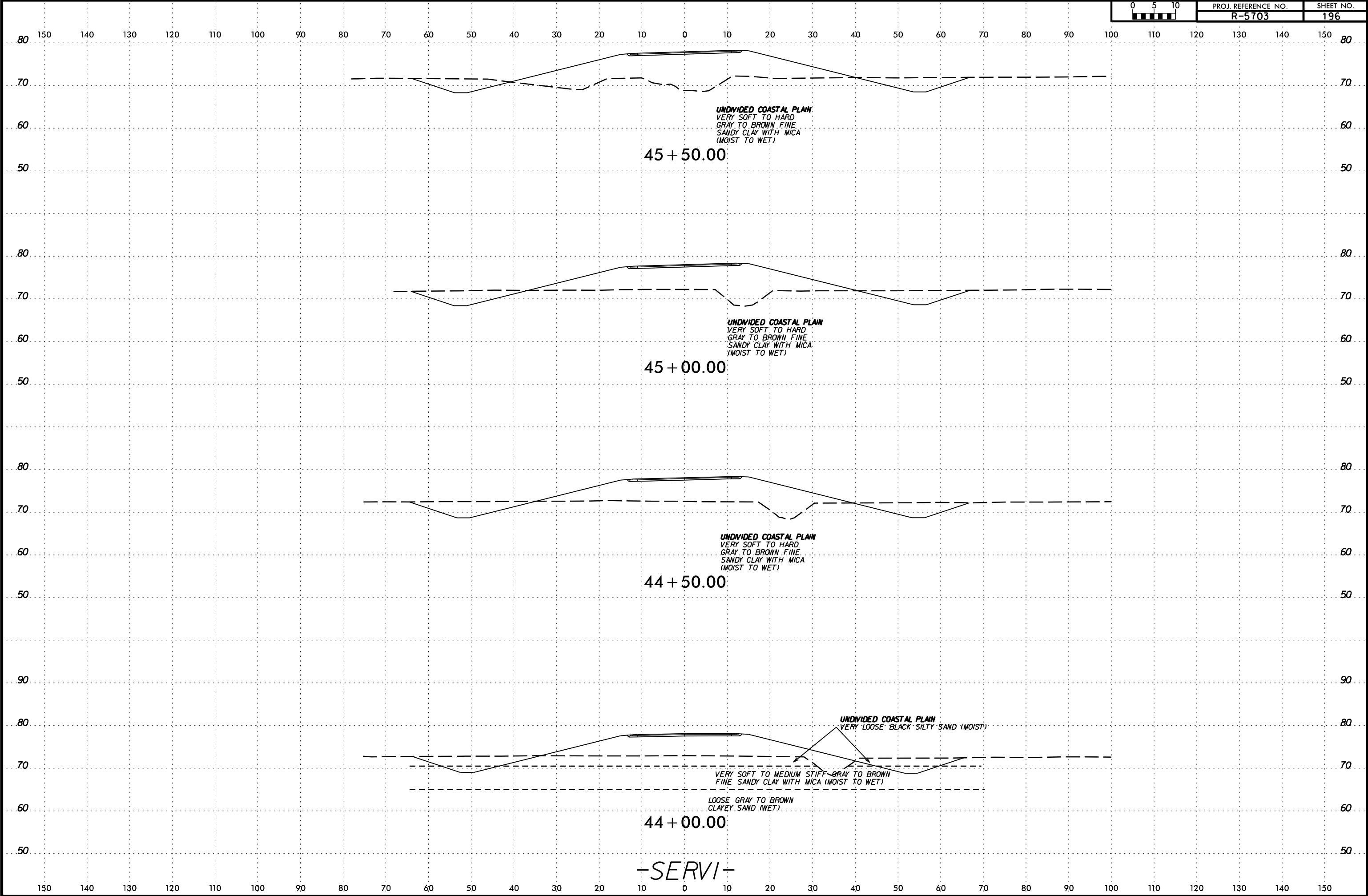


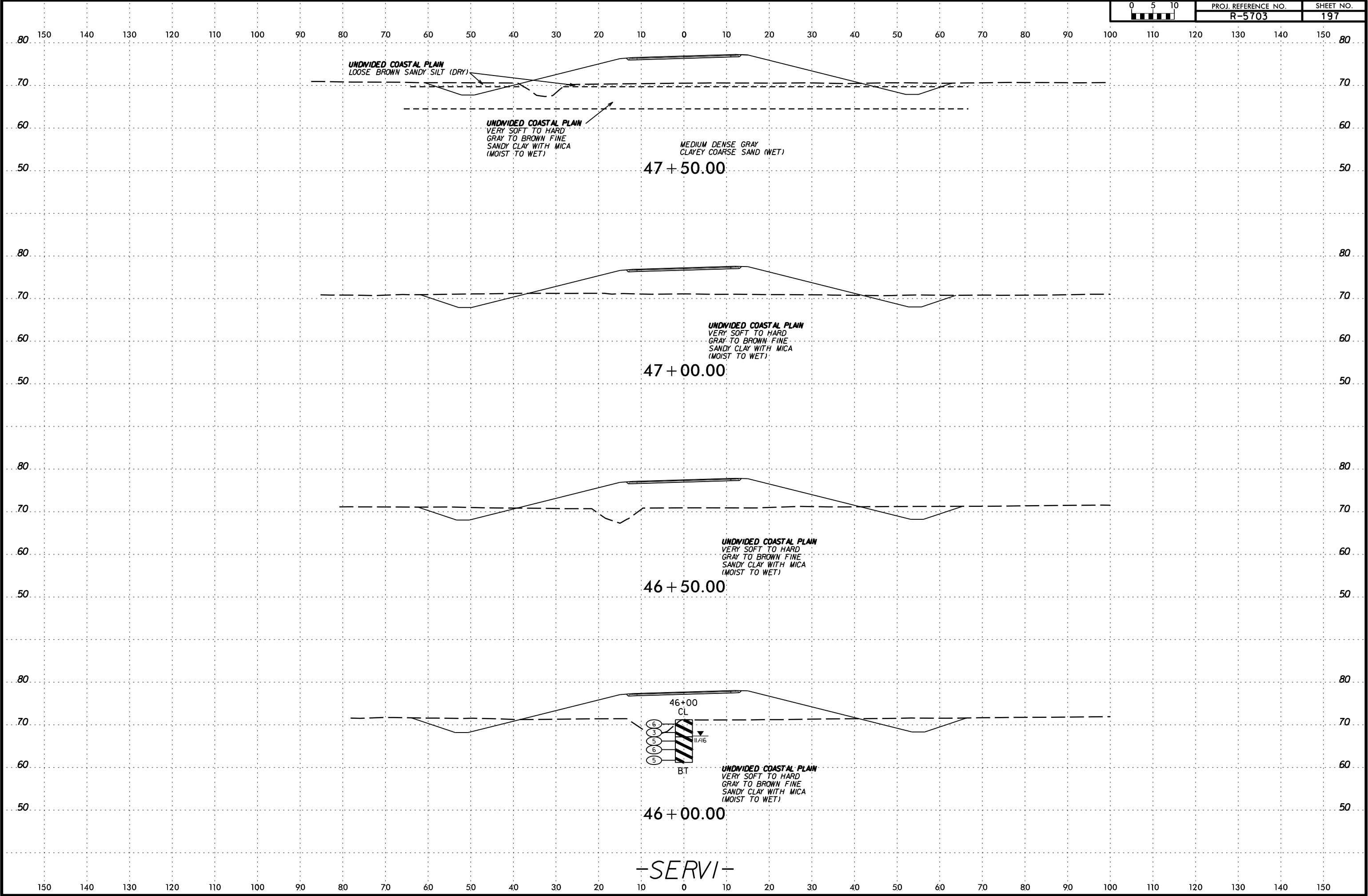
43 + 50.00

43 + 00.00

42 + 50.00

-SERVI-





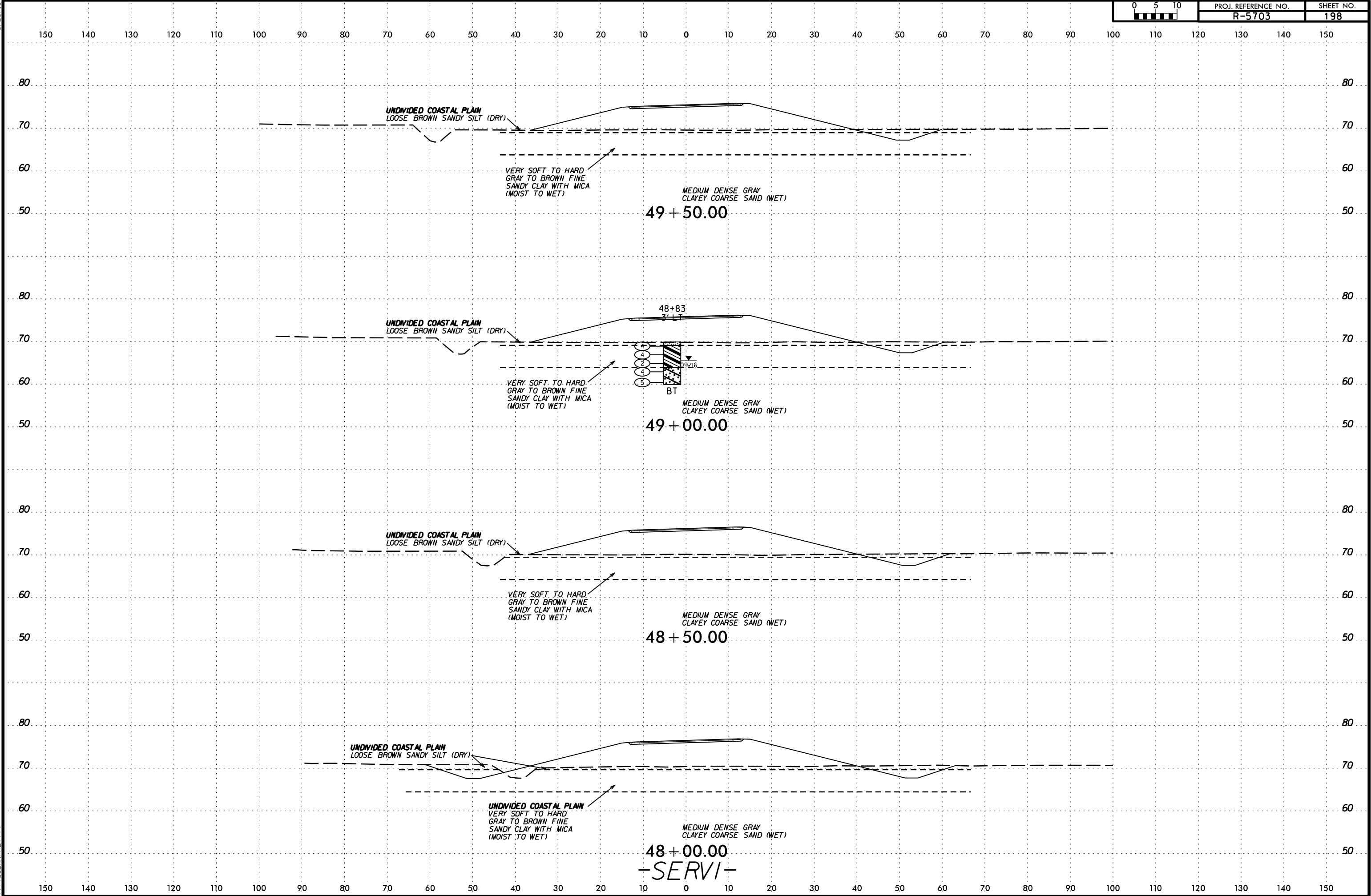


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
198

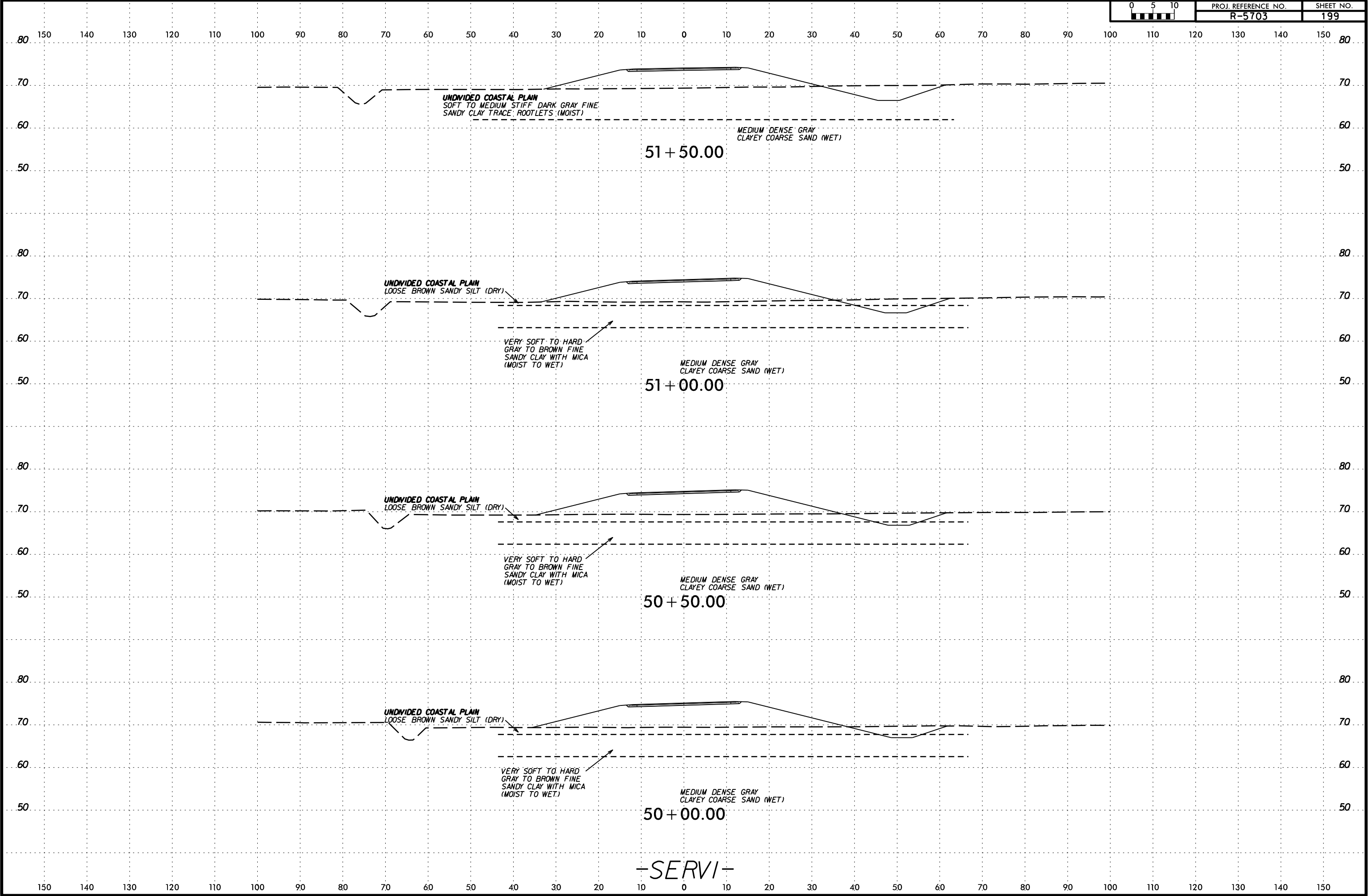


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
199

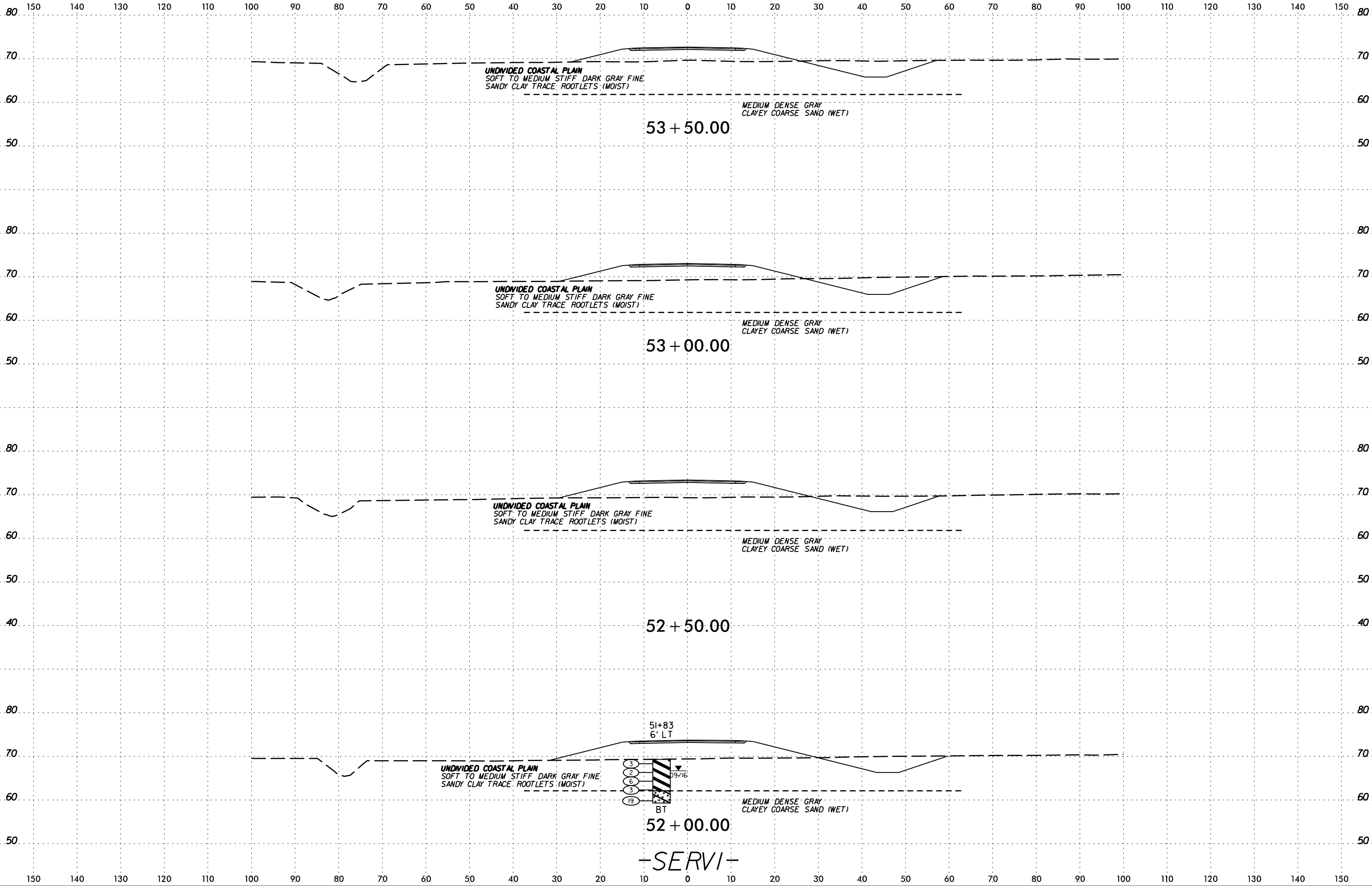


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
200

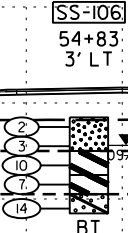


6/23/16

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-106	3' LT	54+83	2.0 - 3.5	A-2-6 (0)	24	11	40	33	10	17	99	75	59	30.1	19.6	ND

UNDIVIDED COASTAL PLAIN  
VERY LOOSE TAN GRAY SILTY  
SAND TRACE GRAVEL (MOIST)



MEDIUM STIFF TO STIFF DARK GRAY  
FINE TO COARSE SANDY CLAY (MOIST)

MEDIUM DENSE GRAY  
CLAYEY COARSE SAND (WET)

55 + 00.00

UNDIVIDED COASTAL PLAIN  
VERY LOOSE TAN GRAY SILTY  
SAND TRACE GRAVEL (MOIST)

MEDIUM STIFF TO STIFF DARK GRAY  
FINE TO COARSE SANDY CLAY (MOIST)

MEDIUM DENSE GRAY  
CLAYEY COARSE SAND (WET)

54 + 50.00

UNDIVIDED COASTAL PLAIN  
VERY LOOSE TAN GRAY SILTY  
SAND TRACE GRAVEL (MOIST)

MEDIUM STIFF TO STIFF DARK GRAY  
FINE TO COARSE SANDY CLAY (MOIST)

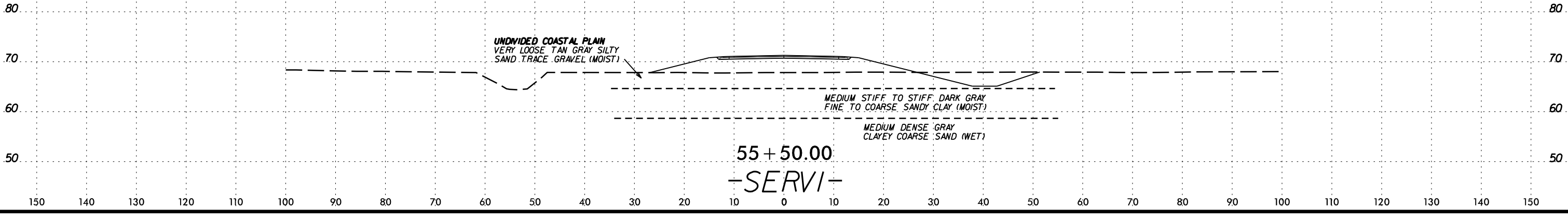
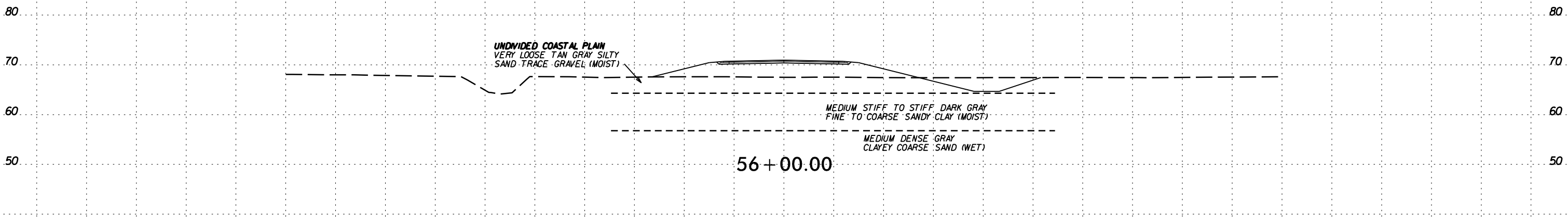
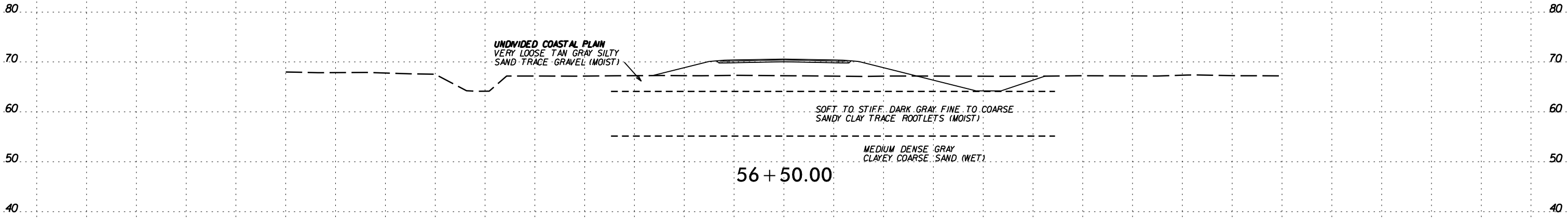
MEDIUM DENSE GRAY  
CLAYEY COARSE SAND (WET)

54 + 00.00

-SERVI-



150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

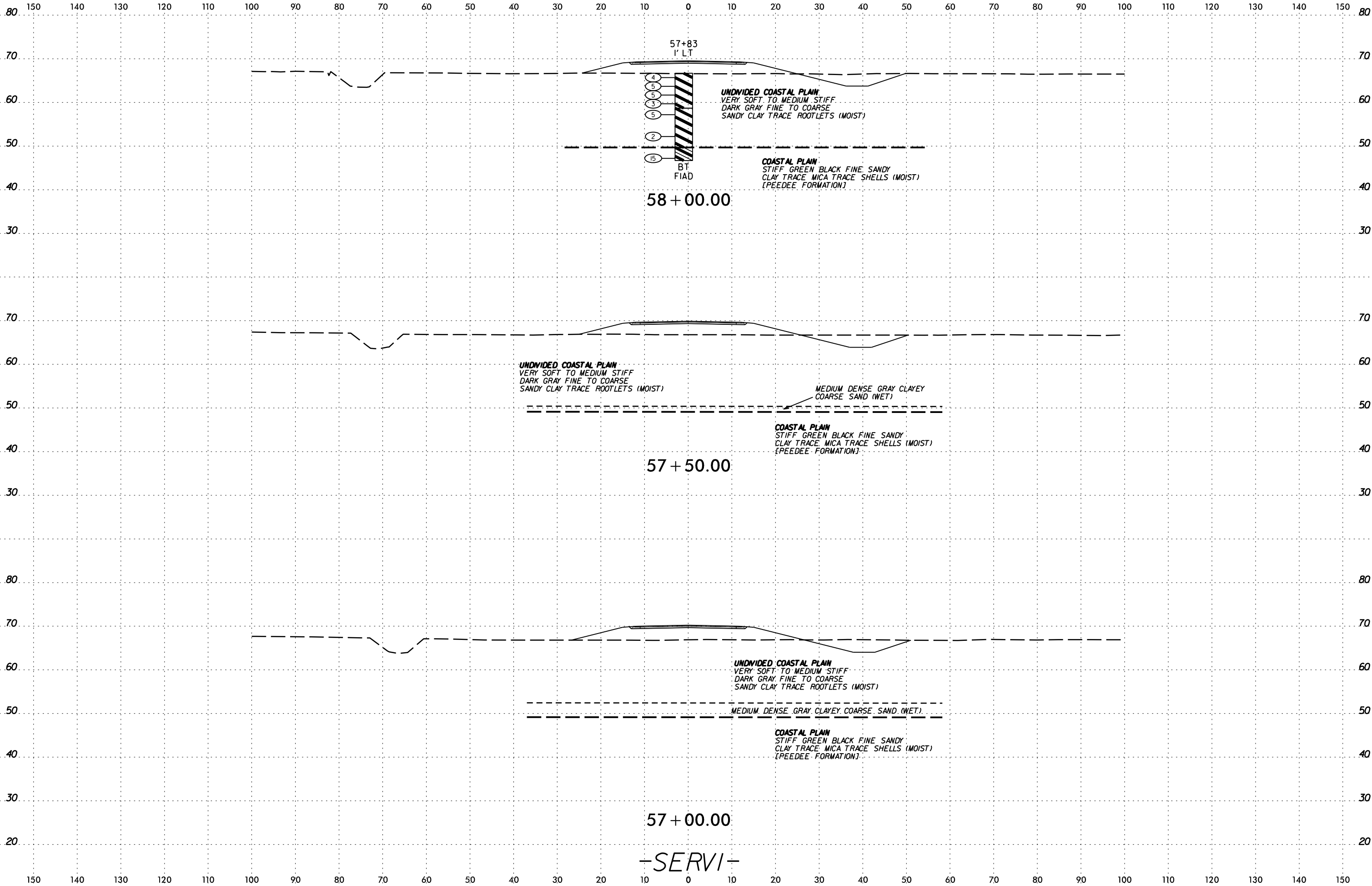


150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

6/23/16



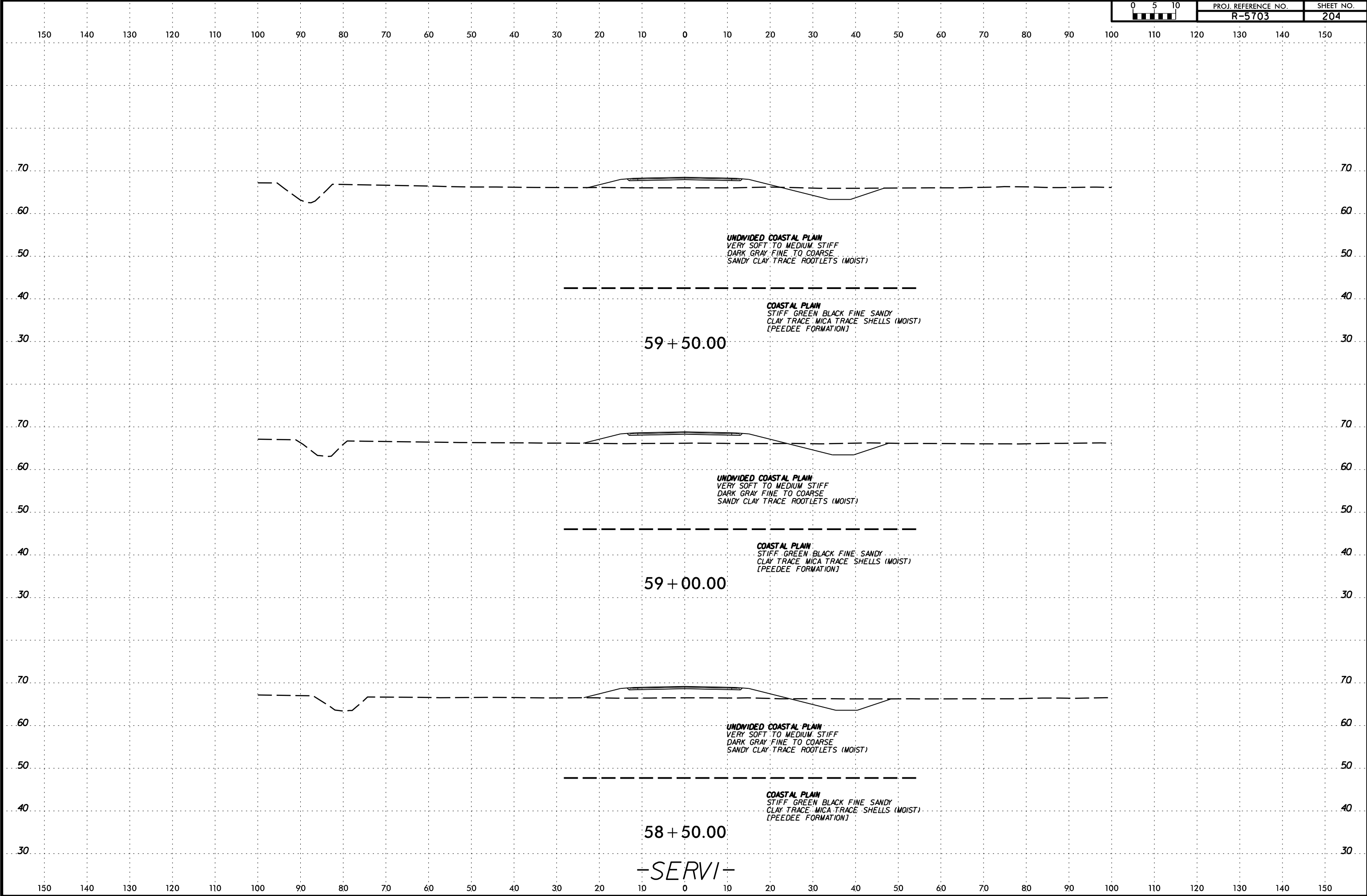
PROJ. REFERENCE NO.	SHEET NO.
R-5703	203



6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	204

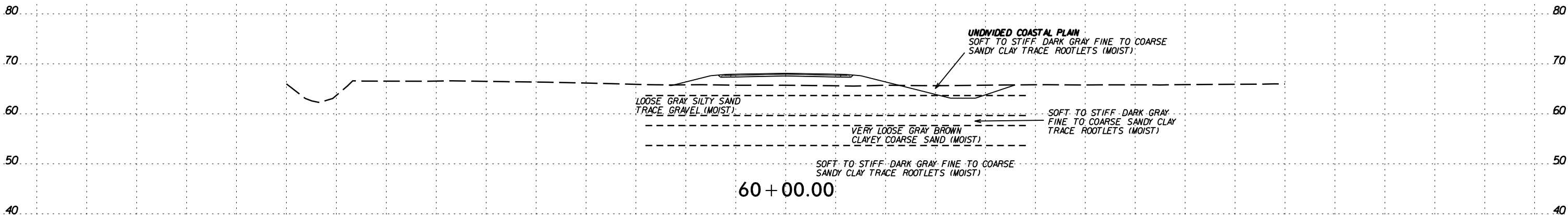
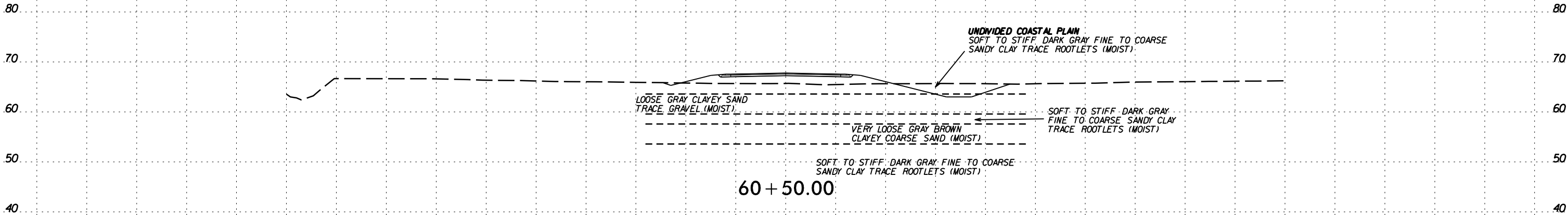


6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	205

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

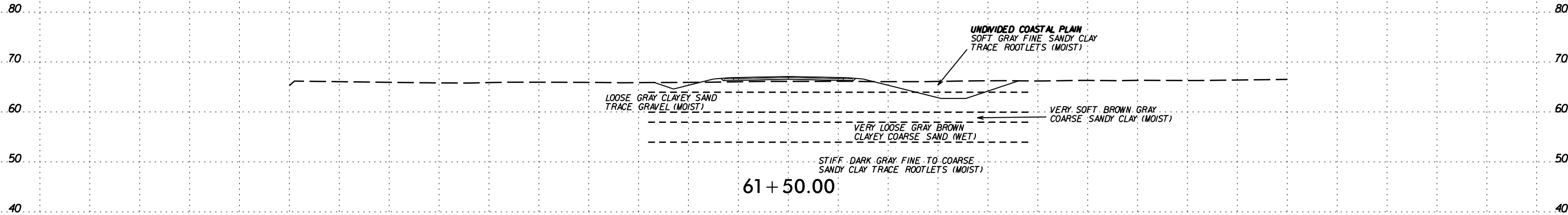
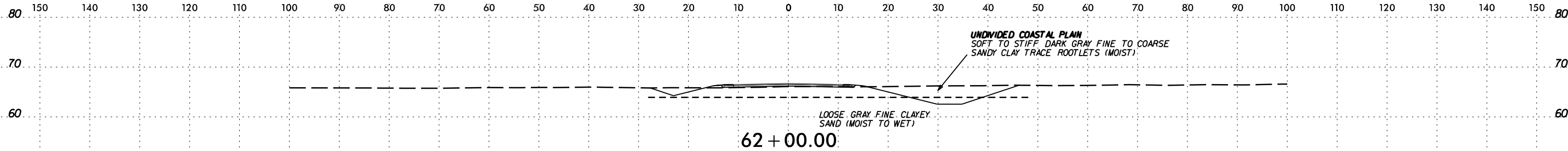


-SERVI-

SECTION  
SURNAME

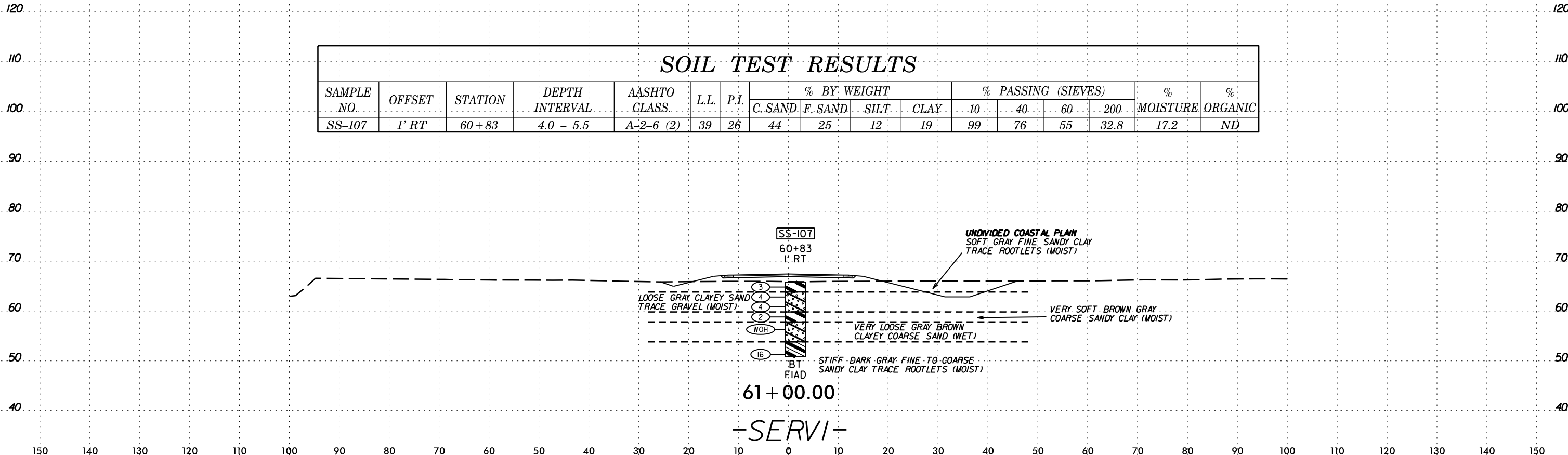


6/23/16



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-107	1' RT	60+83	4.0 - 5.5	A-2-6 (2)	39	26	44	25	12	19	99	76	55	32.8	17.2	ND

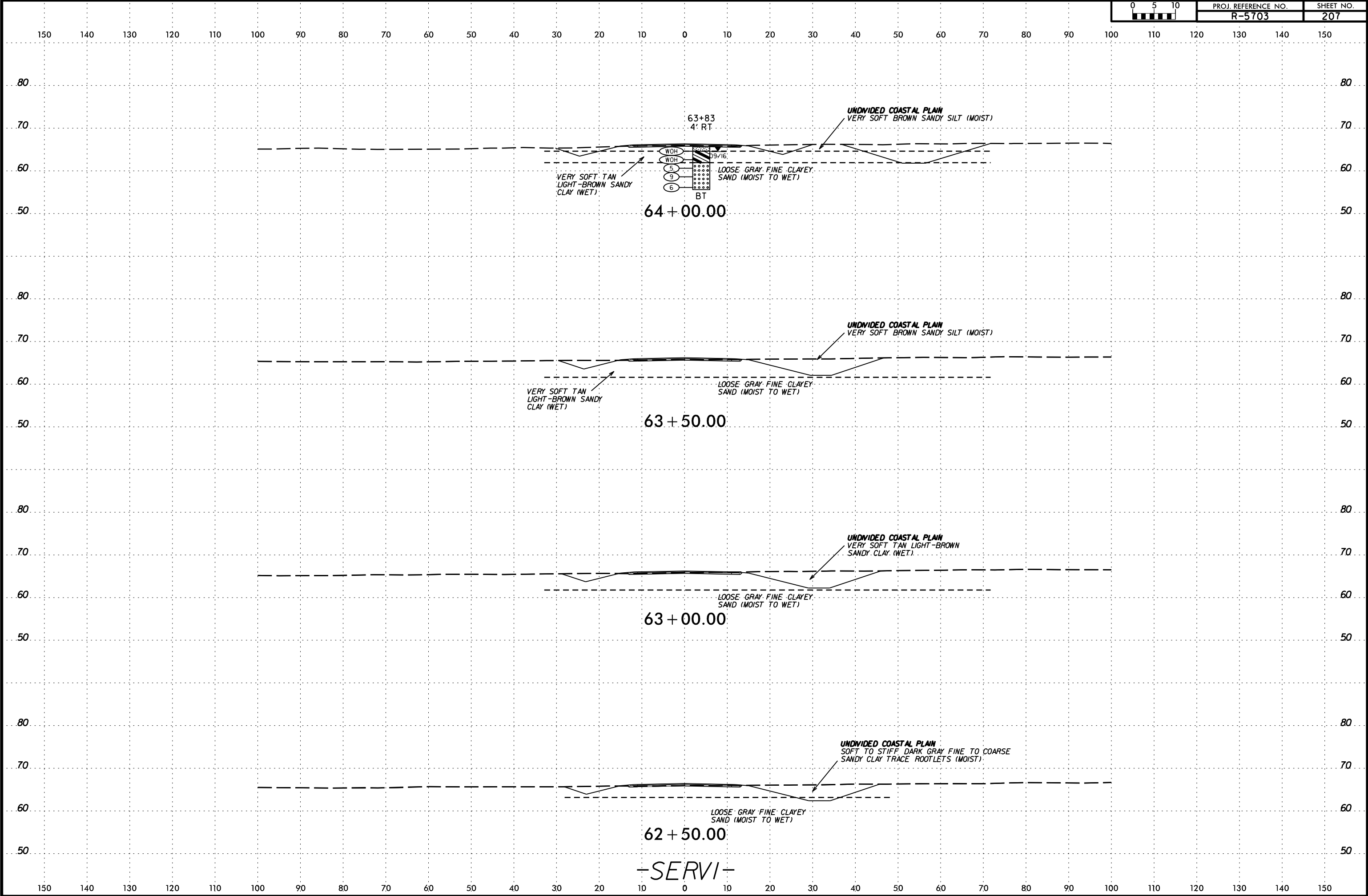


6/23/16



PROJ. REFERENCE NO.  
R-5703

SHEET NO.  
207



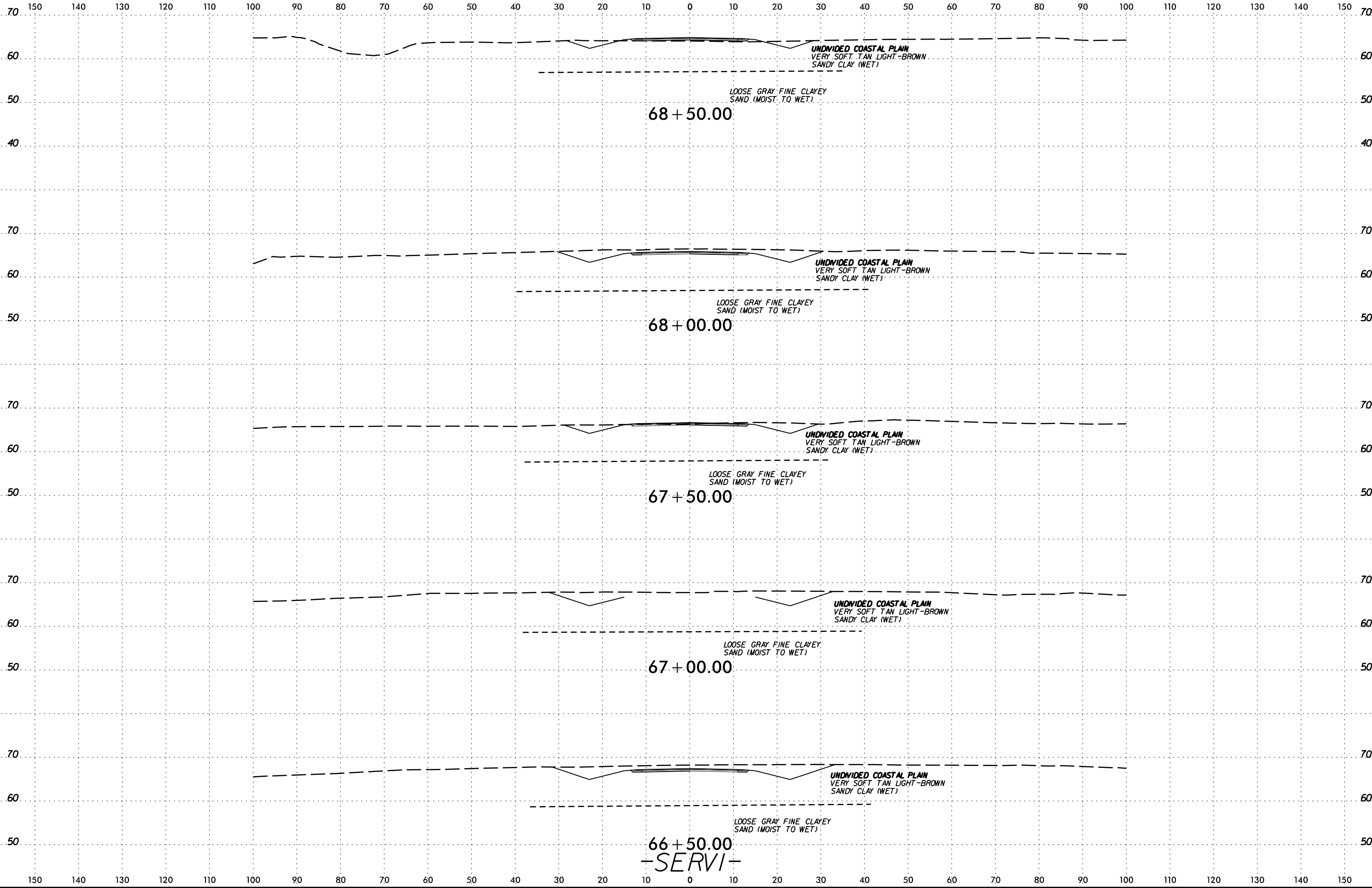


6/23/16



PROJ. REFERENCE NO.  
R-5703

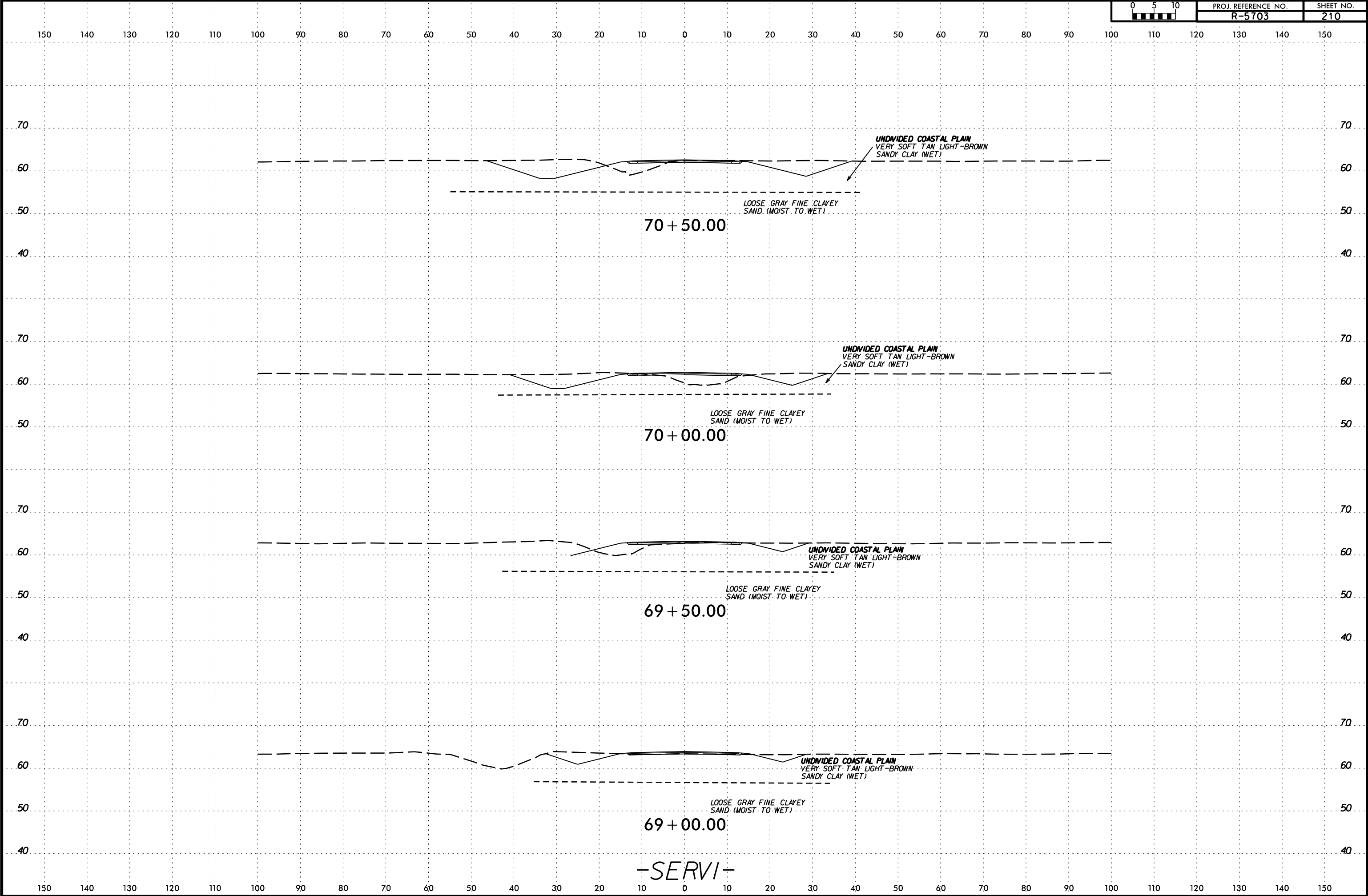
SHEET NO.  
209

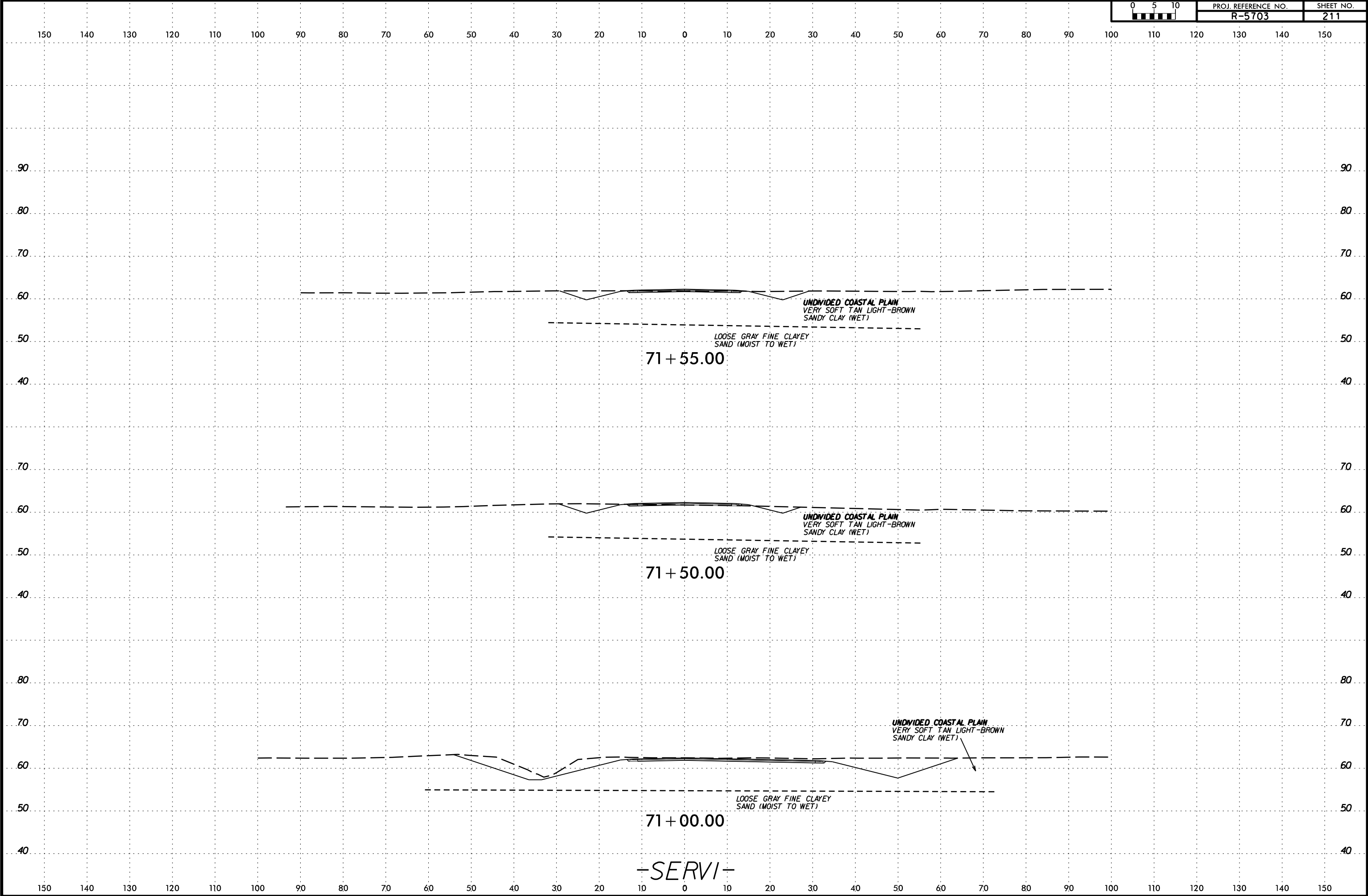


6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-5703	210





PROJECT: 46375      REFERENCE: R-5703

PROJECT REFERENCE NO.	SHEET NO.
R-5703	212

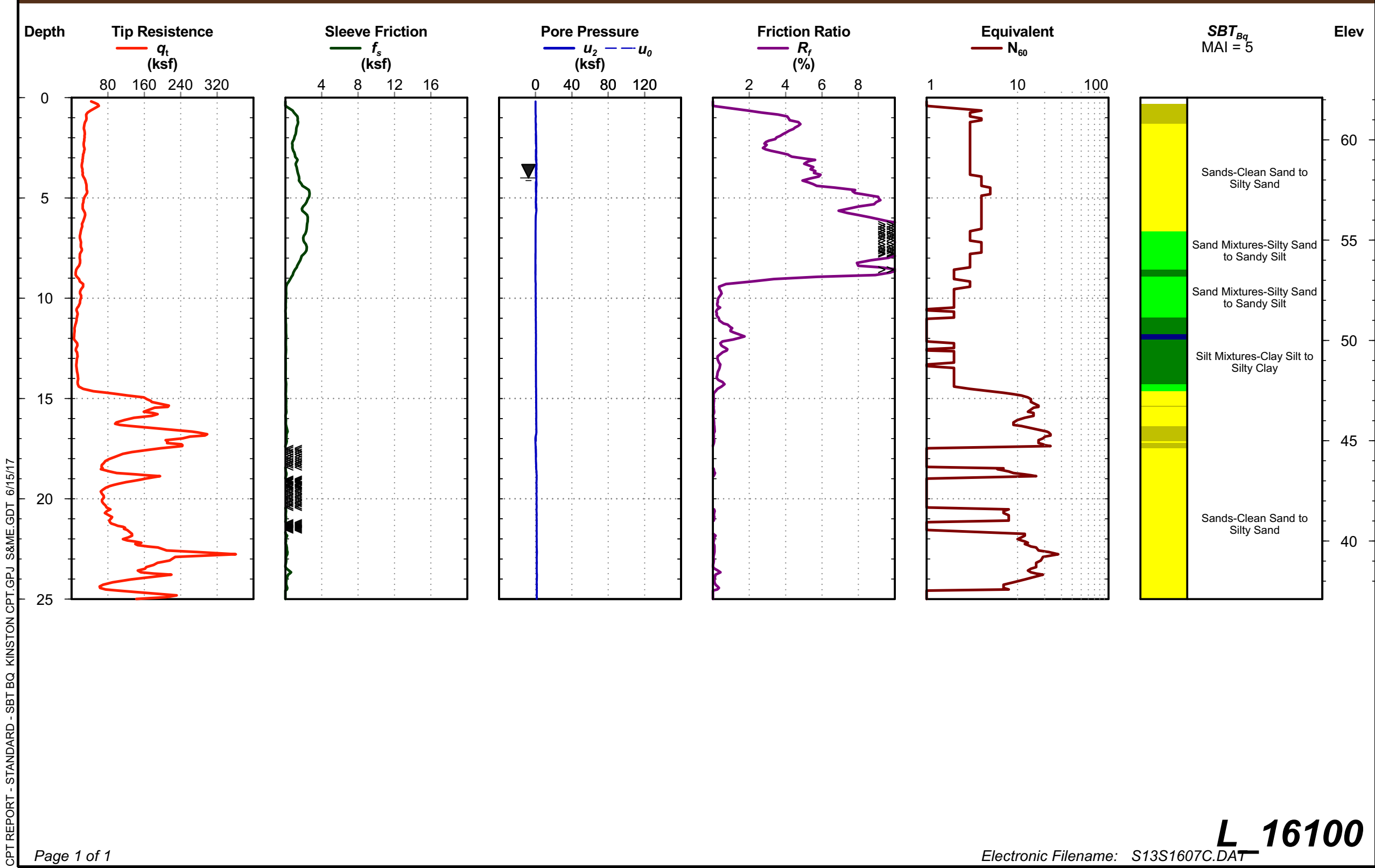
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT  
SUBSURFACE INVESTIGATION  
APPENDIX A  
CPT LOGS

INITIALS	DATE
----------	------

Date: Sep. 13, 2016  
Estimated Water Depth: 4  
Rig/Operator: Marooka/Mike | Lajay

Station: 161+00  
Offset: 75' RT  
Elevation: 62.11

Total Depth: 25.0  
Termination Criteria: Target Depth  
Cone Size: 1.75

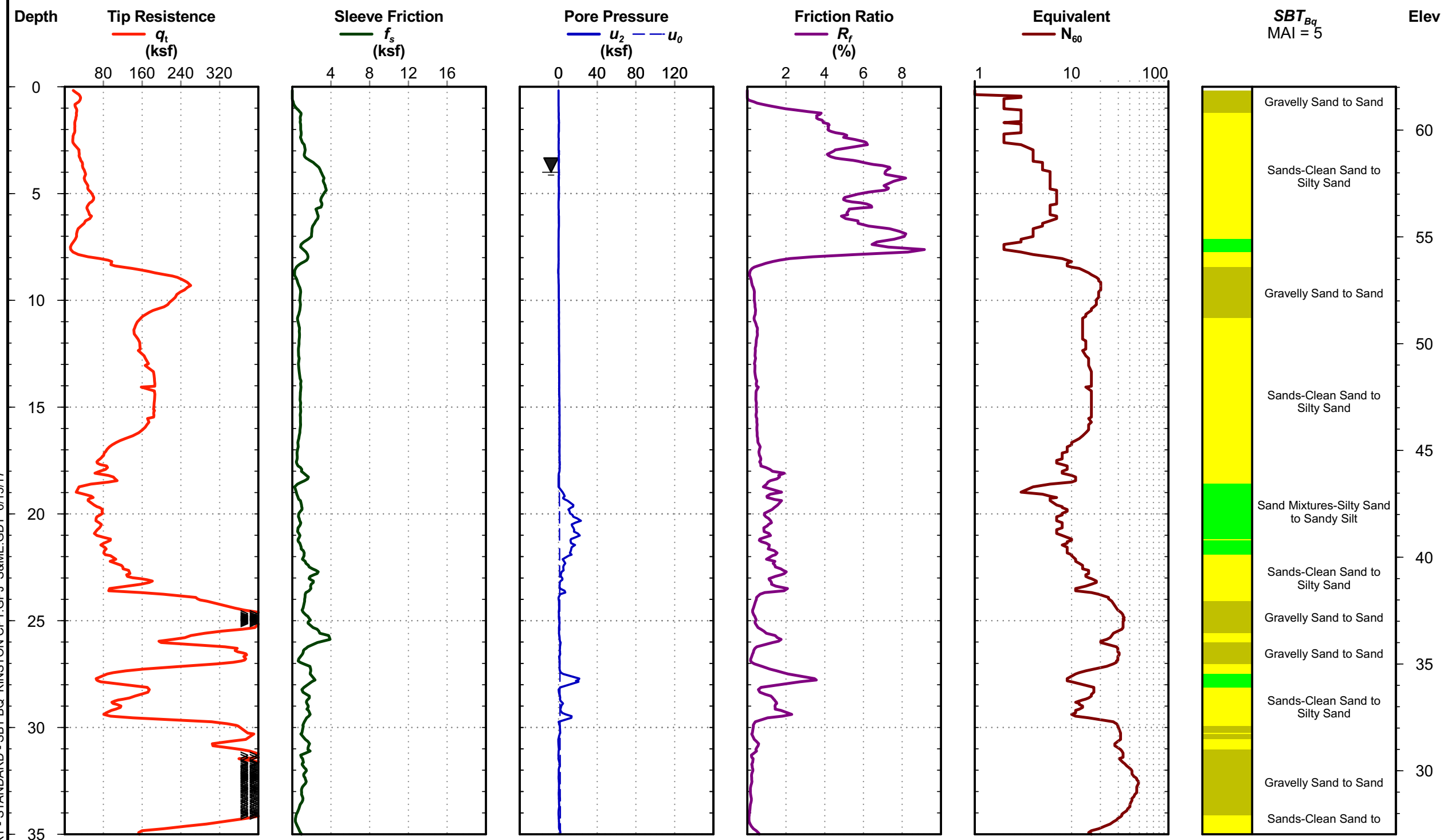




Date: Sep. 13, 2016  
Estimated Water Depth: 4  
Rig/Operator: Marooka/Mike | Lajay

Station: 165+00  
Offset: 0  
Elevation: 62.03

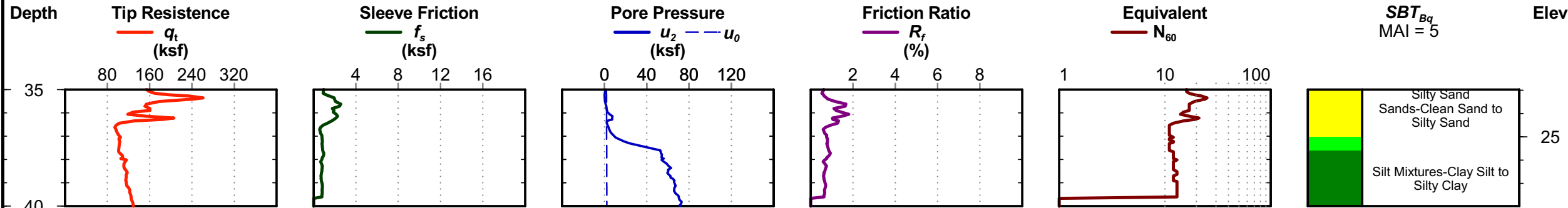
Total Depth: 40.0  
Termination Criteria: Target Depth  
Cone Size: 1.75



Date: Sep. 13, 2016  
Estimated Water Depth: 4  
Rig/Operator: Marooka/Mike | Lajay

Station: 165+00  
Offset: 0  
Elevation: 62.03

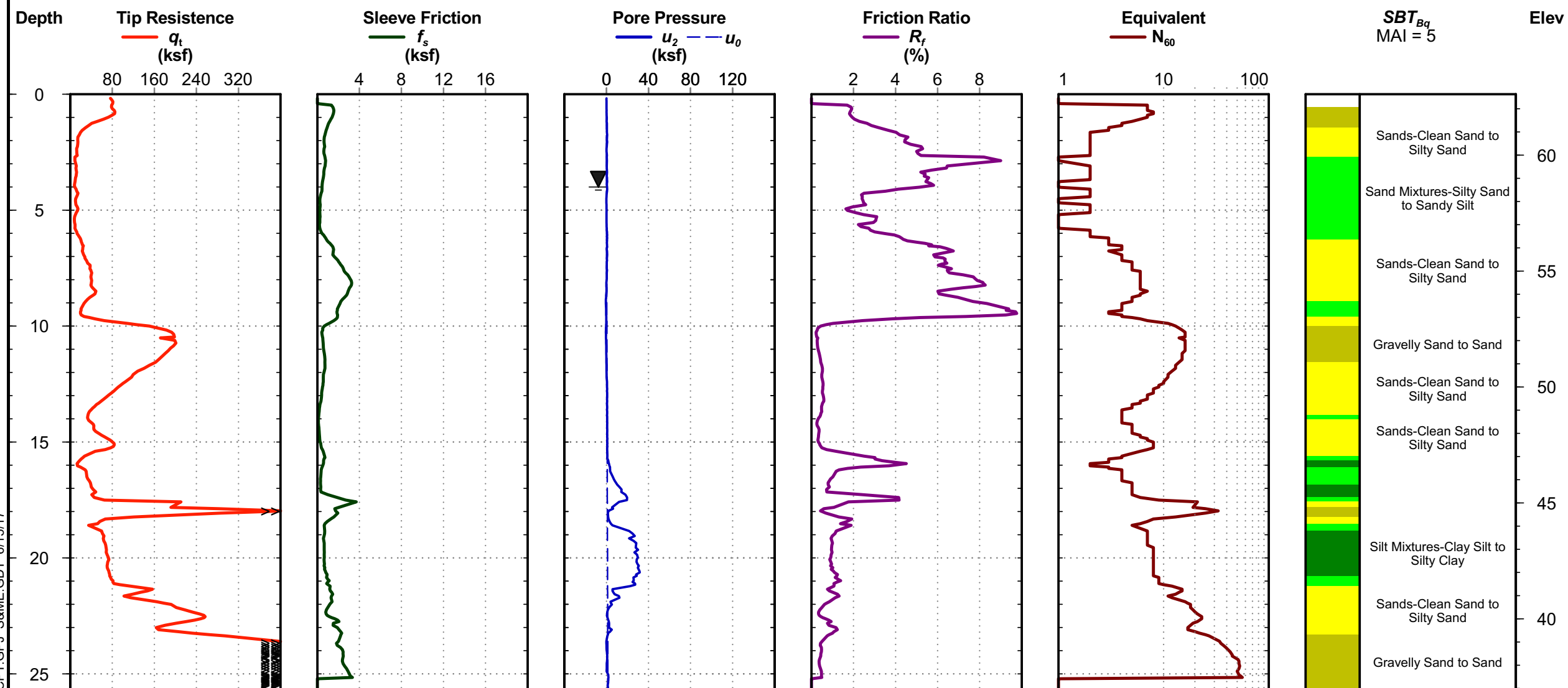
Total Depth: 40.0  
Termination Criteria: Target Depth  
Cone Size: 1.75



Date: Sep. 13, 2016  
Estimated Water Depth: 4  
Rig/Operator: Marooka/Mike | Lajay

Station: 170+00  
Offset: 75' RT  
Elevation: 62.63

Total Depth: 25.7  
Termination Criteria: Maximum Reaction Force  
Cone Size: 1.75

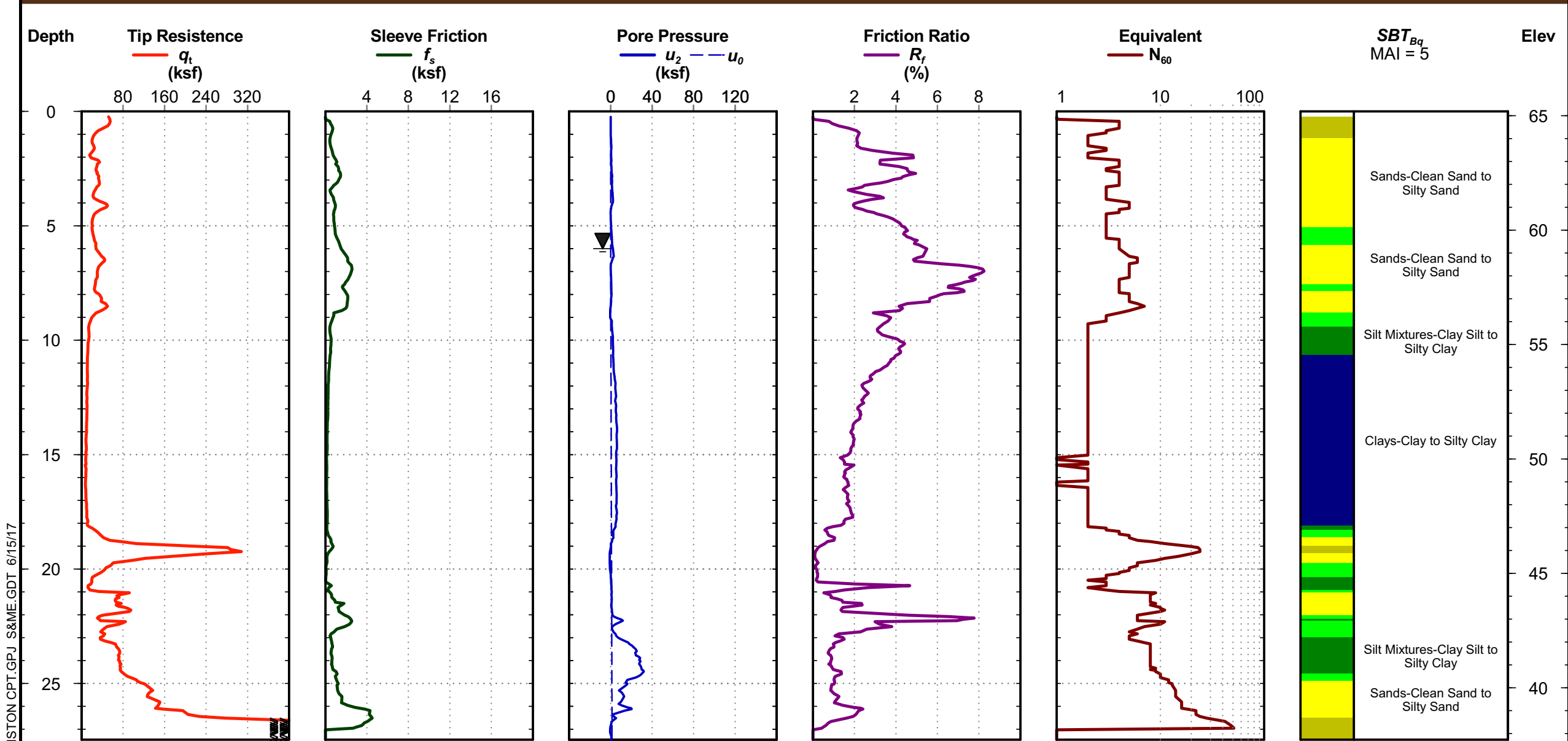


CPT REPORT - STANDARD - SBT BQ KINSTON CPT.GPJ S&ME.GDT 6/15/17

Date: Sep. 13, 2016  
Estimated Water Depth: 6  
Rig/Operator: Marooka/Mike | Lajay

Station: 174+00  
Offset: 75' LT  
Elevation: 65.19

Total Depth: 27.5  
Termination Criteria: Target Depth  
Cone Size: 1.75

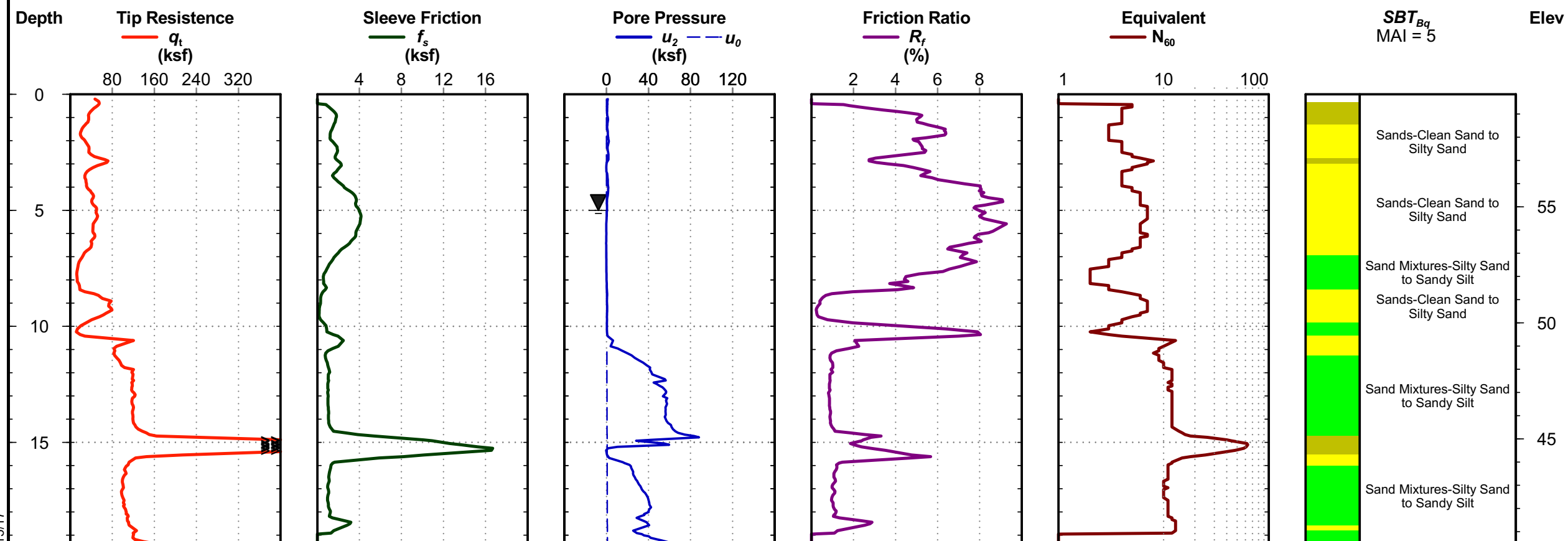


CPT REPORT - STANDARD - SBT BQ KINSTON CPT.GPJ S&ME.GDT 6/15/17

Date: Sep. 14, 2016  
Estimated Water Depth: 5  
Rig/Operator: Marooka/Mike | Lajay

Station: 194+00  
Offset: 75' RT  
Elevation: 59.85

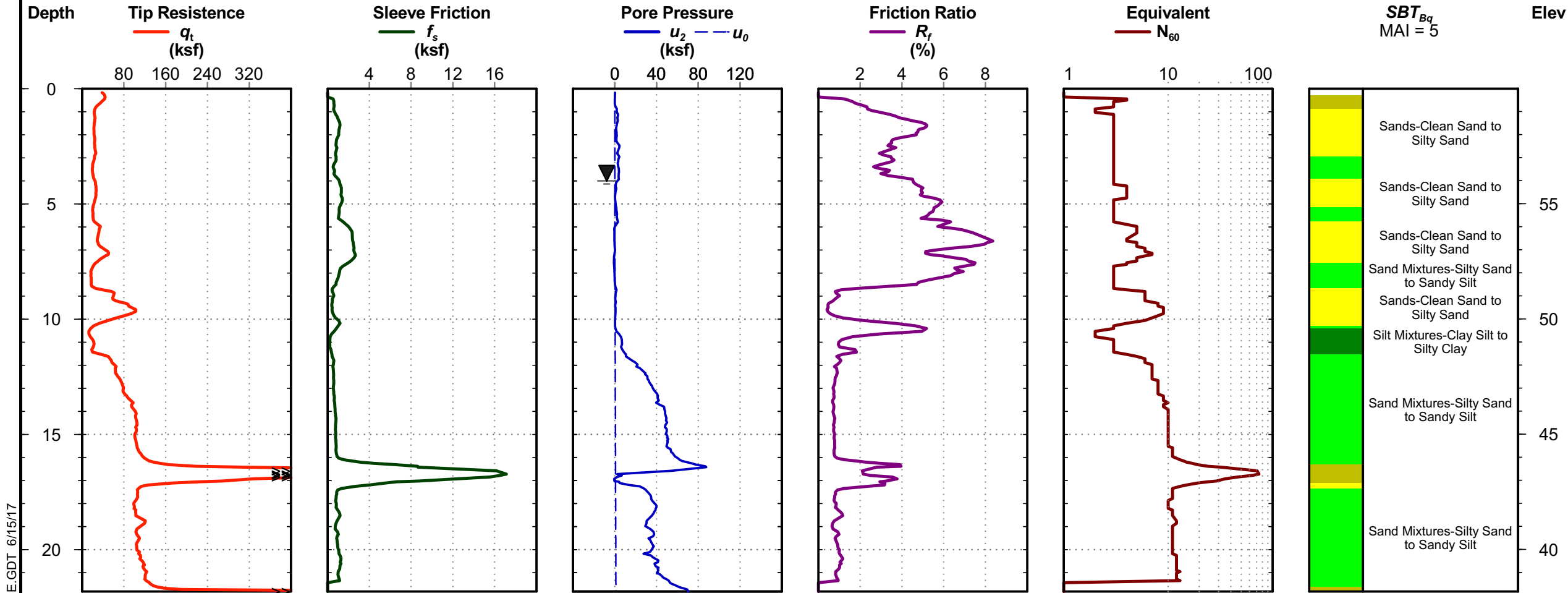
Total Depth: 19.4  
Termination Criteria: Maximum Reaction Force  
Cone Size: 1.75



Date: Sep. 14, 2016  
Estimated Water Depth: 4  
Rig/Operator: Marooka/Mike | Lajay

Station: 198+00  
Offset: 75' LT  
Elevation: 59.99

Total Depth: 21.8  
Termination Criteria: Maximum Reaction Force  
Cone Size: 1.75

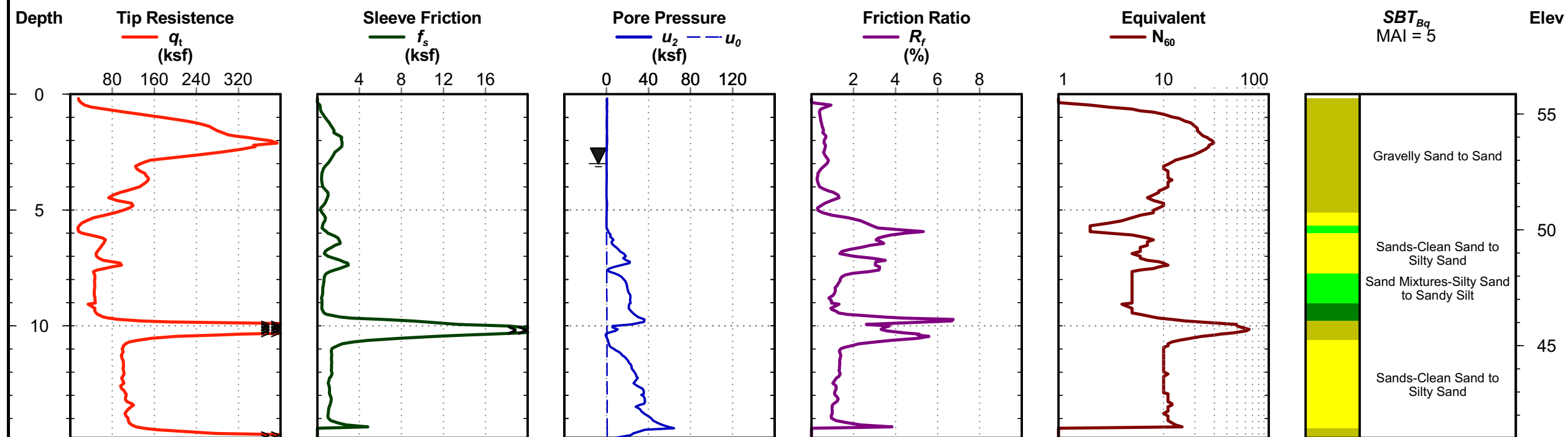


CPT REPORT - STANDARD - SBT BQ KINSTON CPT.GPJ S&ME.GDT 6/15/17

Date: Sep. 14, 2016  
Estimated Water Depth: 3  
Rig/Operator: Marooka/Mike | Lajay

Station: 202+94  
Offset: 68.61' RT  
Elevation: 55.86

Total Depth: 14.8  
Termination Criteria: Maximum Reaction Force  
Cone Size: 1.75



C.F. Harvey Parkway extension  
Kinston, North Carolina (Kinston)  
S&ME Project No: 6235-16-010

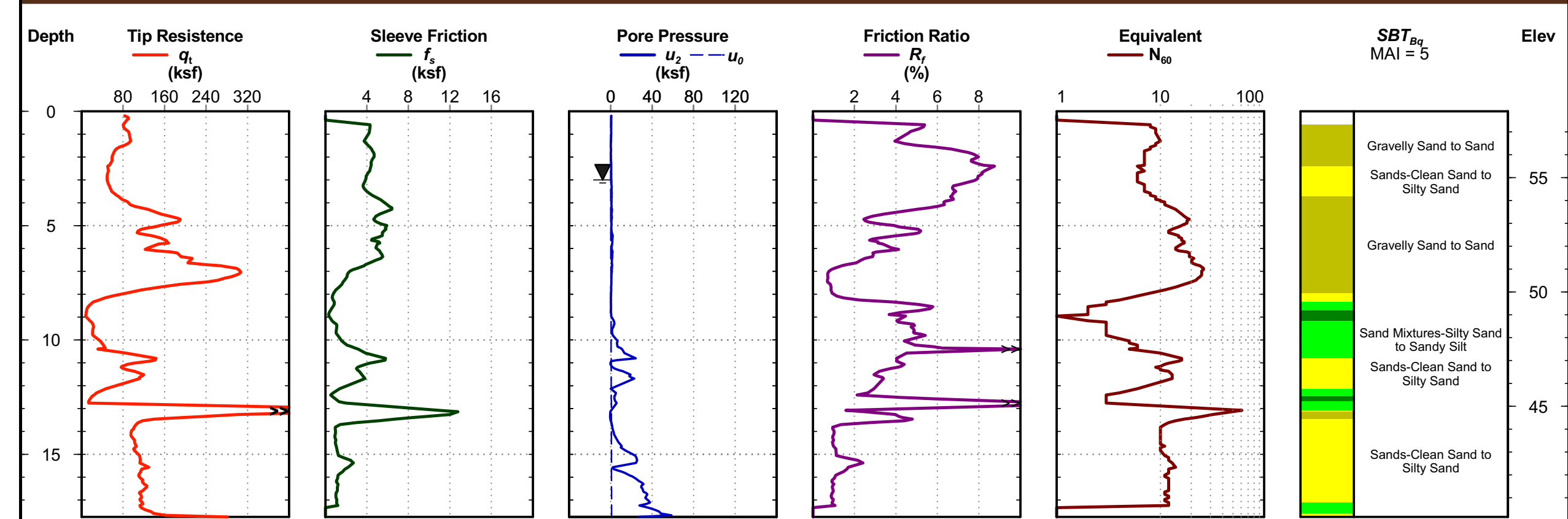
# Cone Penetration Test

## L\_20700

Date: Sep. 14, 2016  
Estimated Water Depth: 3  
Rig/Operator: Marooka/Mike | Lajay

Station: 207+00  
Offset: 75' LT  
Elevation: 57.9

Total Depth: 17.7  
Termination Criteria: Maximum Reaction Force  
Cone Size: 1.75



CPT REPORT - STANDARD - SBT BQ KINSTON CPT.GPJ S&ME.GDT 6/15/17



Date: Sep. 14, 2016

Estimated Water Depth: 4

Rig/Operator: Marooka/Mike | Lajay

Station: 209+00

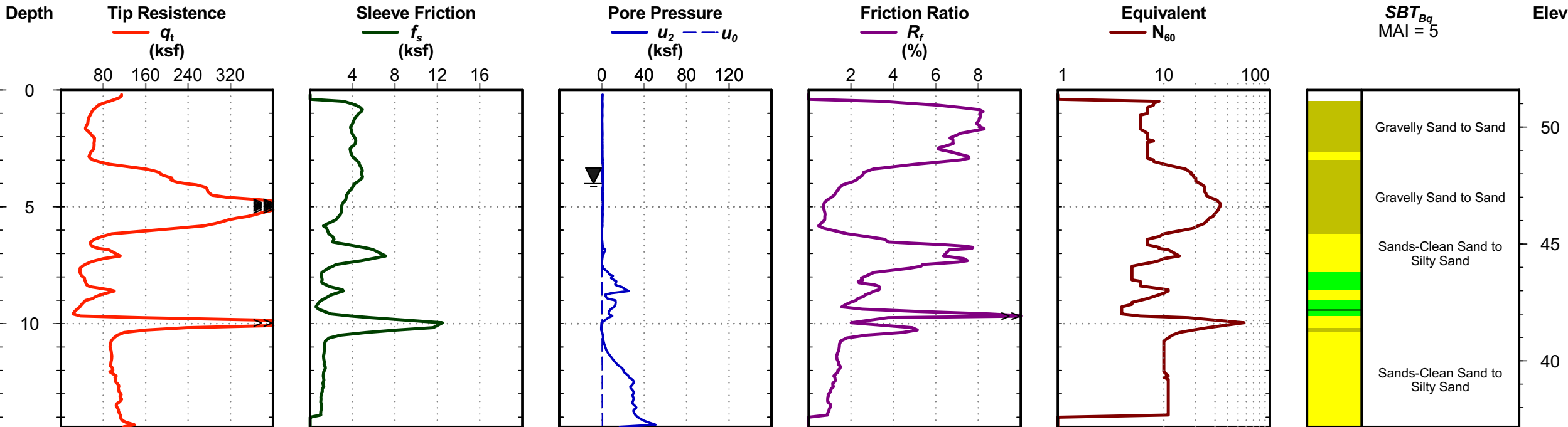
Offset: 75' RT

Elevation: 51.59

Total Depth: 14.4

Termination Criteria: Maximum Reaction Force

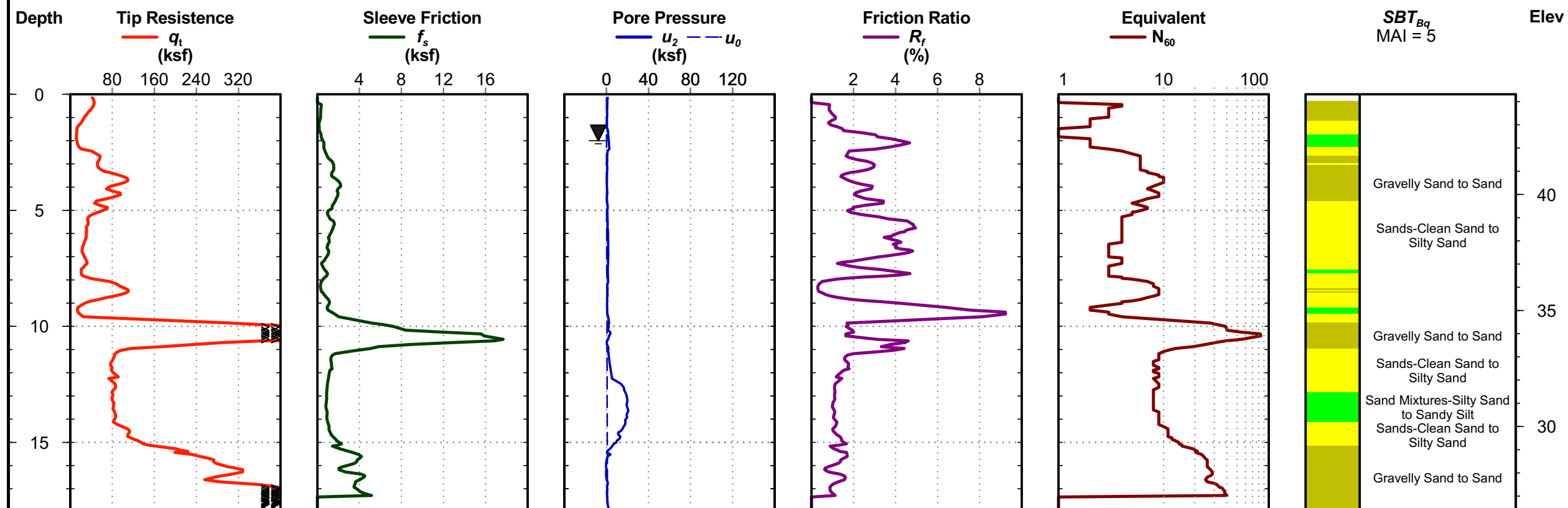
Cone Size: 1.75



Date: Sep. 14, 2016  
Estimated Water Depth: 2  
Rig/Operator: Marooka/Mike | Lajay

Station: 213+00  
Offset: 75  
Elevation: 44.32

Total Depth: 17.9  
Termination Criteria: Maximum Reaction Force  
Cone Size: 1.75



CPT REPORT - STANDARD - SBT BQ KINSTON CPT.GPJ S&ME.GDT 6/15/17

C.F. Harvey Parkway extension  
Kinston, North Carolina (Kinston)  
S&ME Project No: 6235-16-010

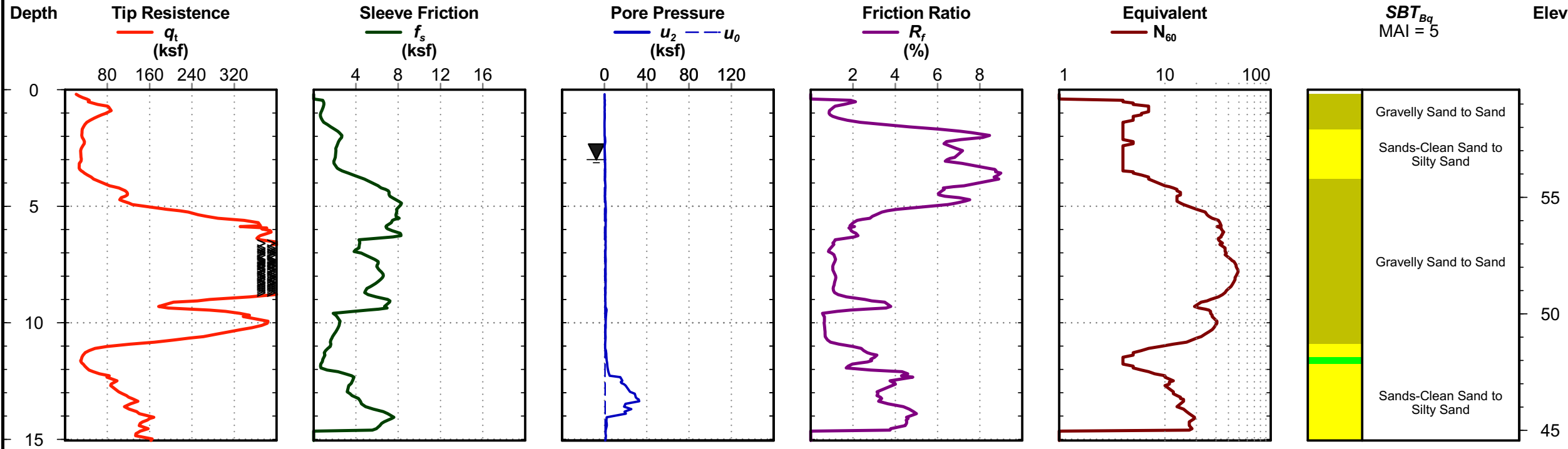
# Cone Penetration Test

## L\_22500

Date: Sep. 14, 2016  
Estimated Water Depth: 3  
Rig/Operator: Marooka/Mike | Lajay

Station: 225+00  
Offset: 0  
Elevation: 59.62

Total Depth: 15.1  
Termination Criteria: Target Depth  
Cone Size: 1.75

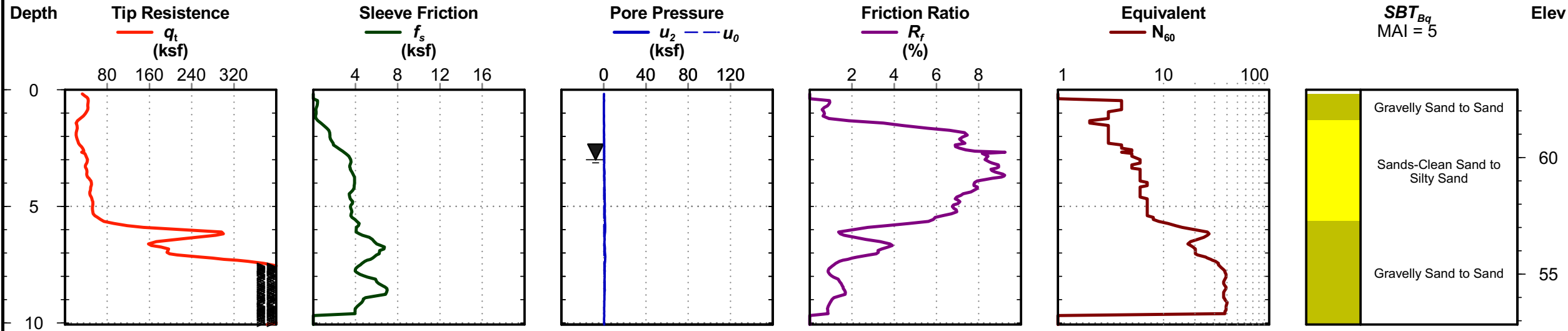


CPT REPORT - STANDARD - SBT BQ KINSTON CPT.GPJ S&ME.GDT 6/15/17

Date: Sep. 14, 2016  
Estimated Water Depth: 3  
Rig/Operator: Marooka/Mike | Lajay

Station: 229+00  
Offset: 65' RT  
Elevation: 62.91

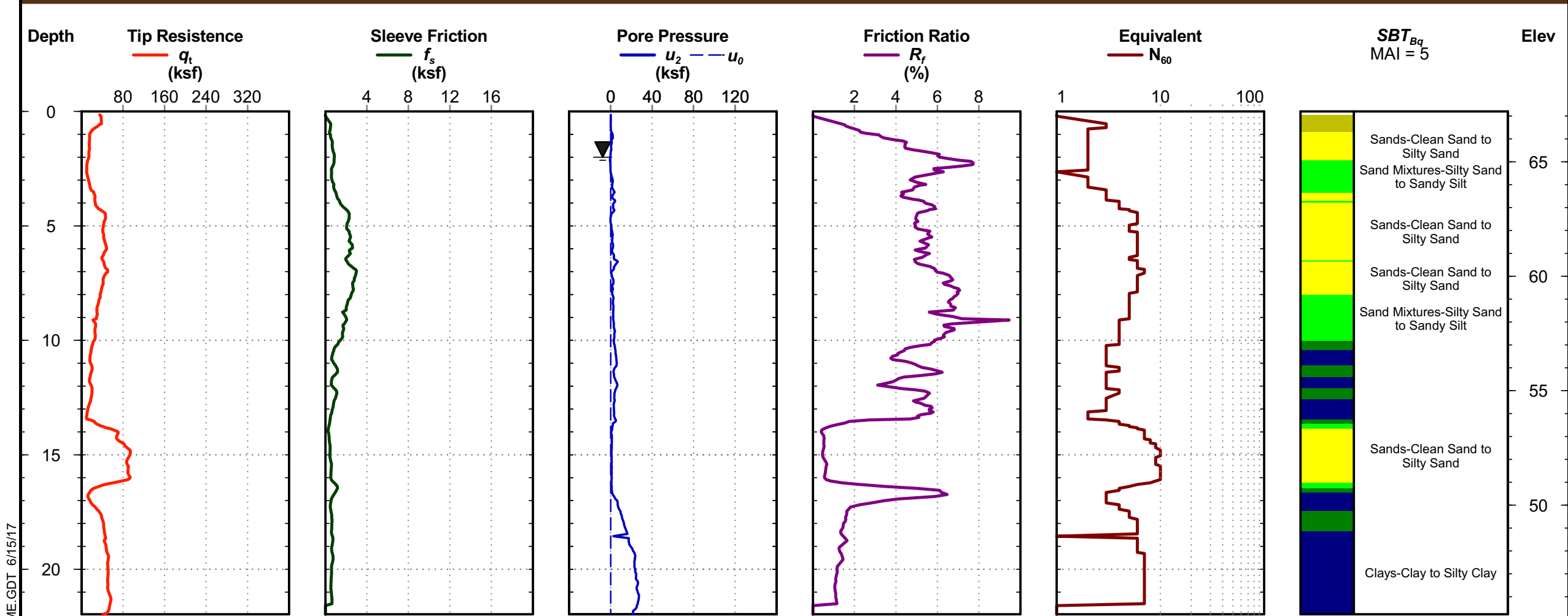
Total Depth: 10.1  
Termination Criteria: Target Depth  
Cone Size: 1.75



Date: Sep. 15, 2016  
Estimated Water Depth: 2  
Rig/Operator: Marooka/Mike | Lajay

Station: 275+00  
Offset: 75' LT  
Elevation: 67.2

Total Depth: 22.0  
Termination Criteria: Target Depth  
Cone Size: 1.75

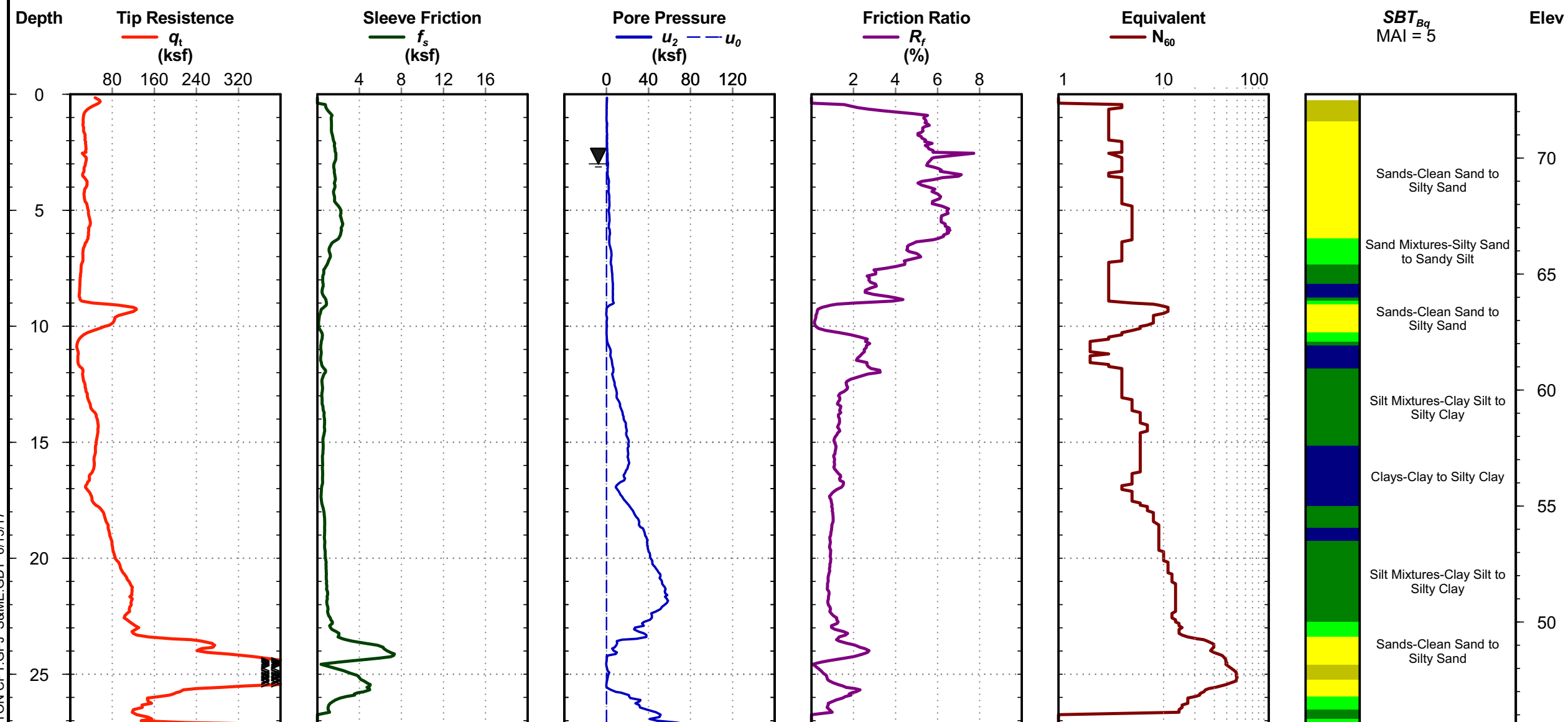


CPT REPORT - STANDARD - SBT BQ KINSTON CPT.GPJ S&ME.GDT 6/15/17

Date: Sep. 15, 2016  
Estimated Water Depth: 3  
Rig/Operator: Marooka/Mike | Lajay

Station: 278+99  
Offset: 71.37 RT  
Elevation: 72.75

Total Depth: 27.2  
Termination Criteria: Maximum Reaction Force  
Cone Size: 1.75

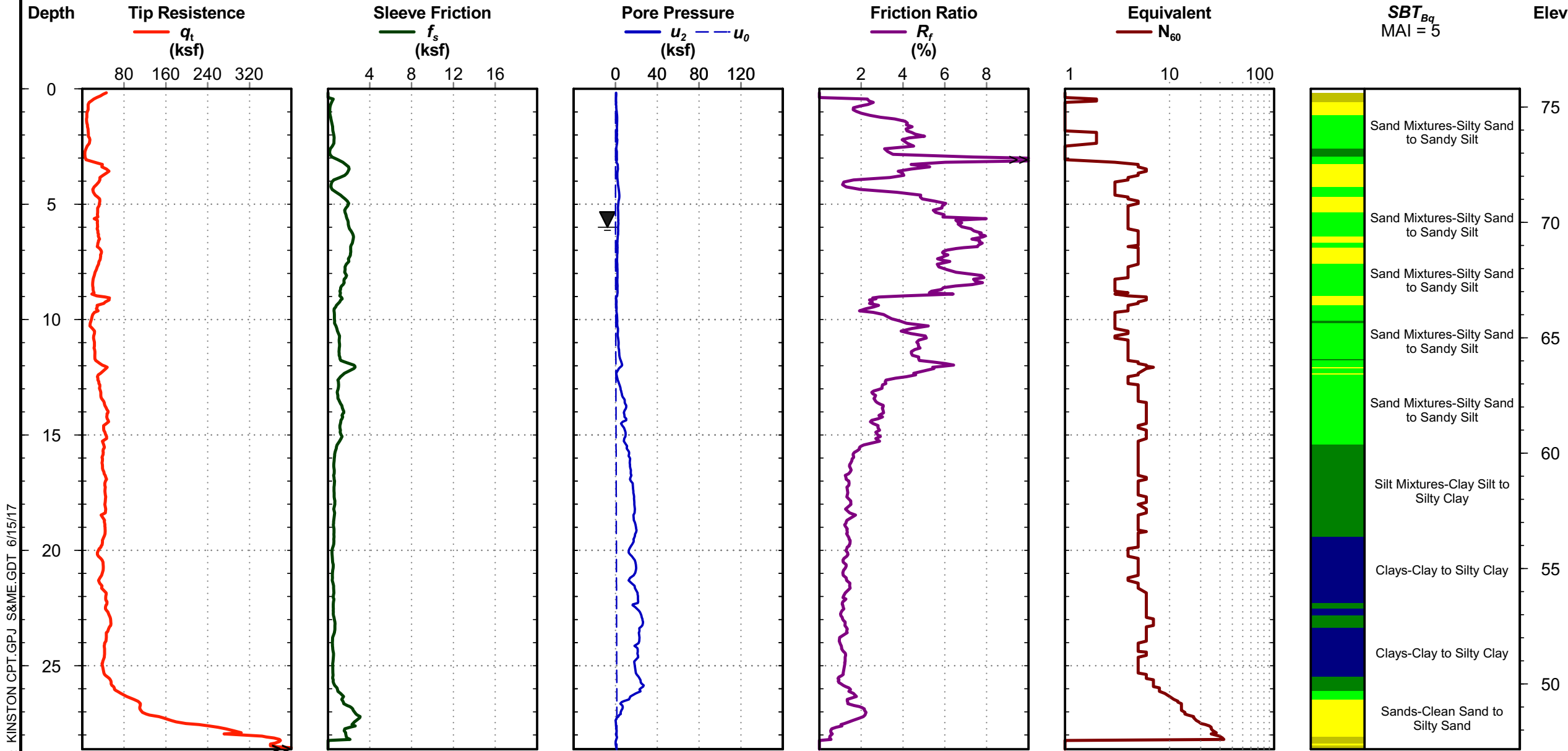


CPT REPORT - STANDARD - SBT BQ KINSTON CPT.GPJ S&ME.GDT 6/15/17

Date: Sep. 15, 2016  
Estimated Water Depth: 6  
Rig/Operator: Marooka/Mike | Lajay

Station: 284+00  
Offset: 75 LT  
Elevation: 75.79

Total Depth: 28.6  
Termination Criteria: Maximum Reaction Force  
Cone Size: 1.75

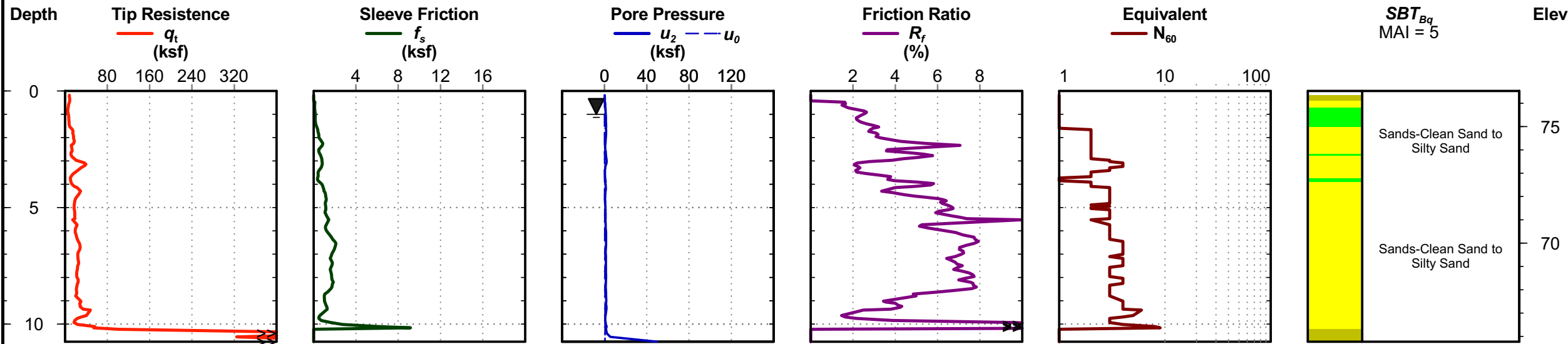


CPT REPORT - STANDARD - SBT BQ KINSTON CPT.GPJ S&ME.GDT 6/15/17

Date: Sep. 15, 2016  
Estimated Water Depth: 1  
Rig/Operator: Marooka/Mike | Lajay

Station: 288+00  
Offset: 75' RT  
Elevation: 76.53

Total Depth: 10.8  
Termination Criteria: Maximum Reaction Force  
Cone Size: 1.75

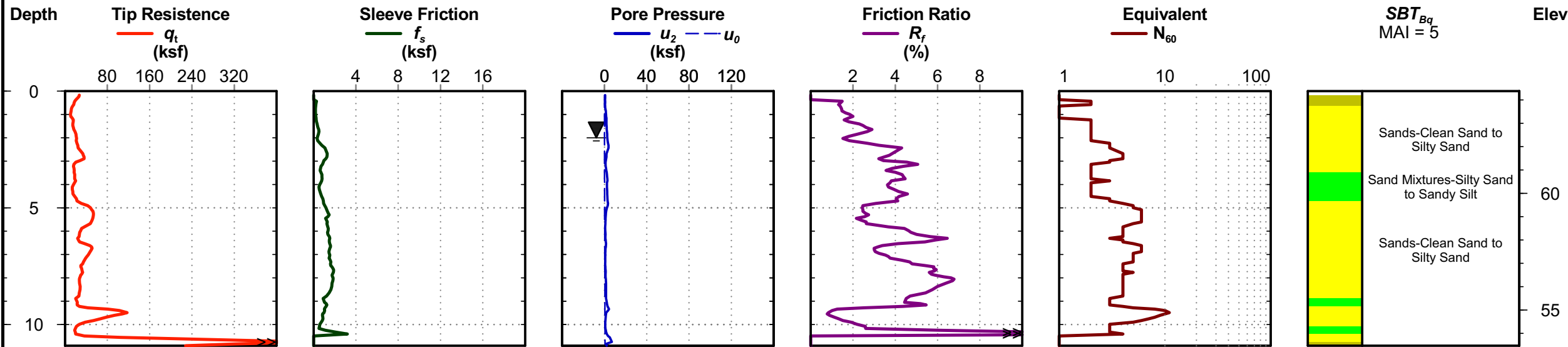




Date: Sep. 15, 2016  
Estimated Water Depth: 2  
Rig/Operator: Marooka/Mike | Lajay

Station: 335+00  
Offset: 75' RT  
Elevation: 64.38

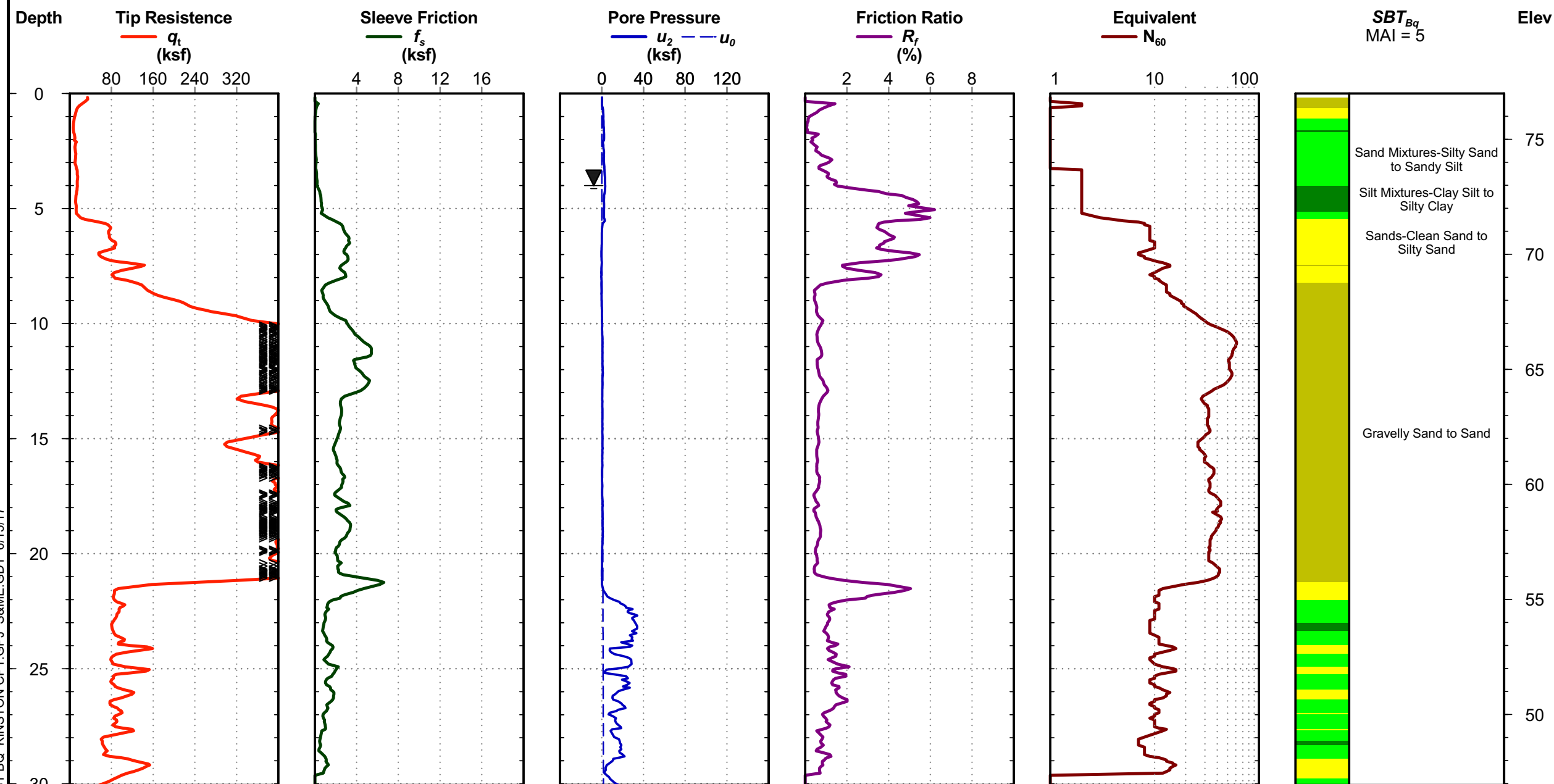
Total Depth: 10.9  
Termination Criteria: Maximum Reaction Force  
Cone Size: 1.75



Date: Sep. 13, 2016  
Estimated Water Depth: 4  
Rig/Operator: Marooka/Mike | Lajay

Station: 83+00  
Offset: 75' LT  
Elevation: 76.99

Total Depth: 30.1  
Termination Criteria: Target Depth  
Cone Size: 1.75



C.F. Harvey Parkway extension  
Kinston, North Carolina (Kinston)  
S&ME Project No: 6235-16-010

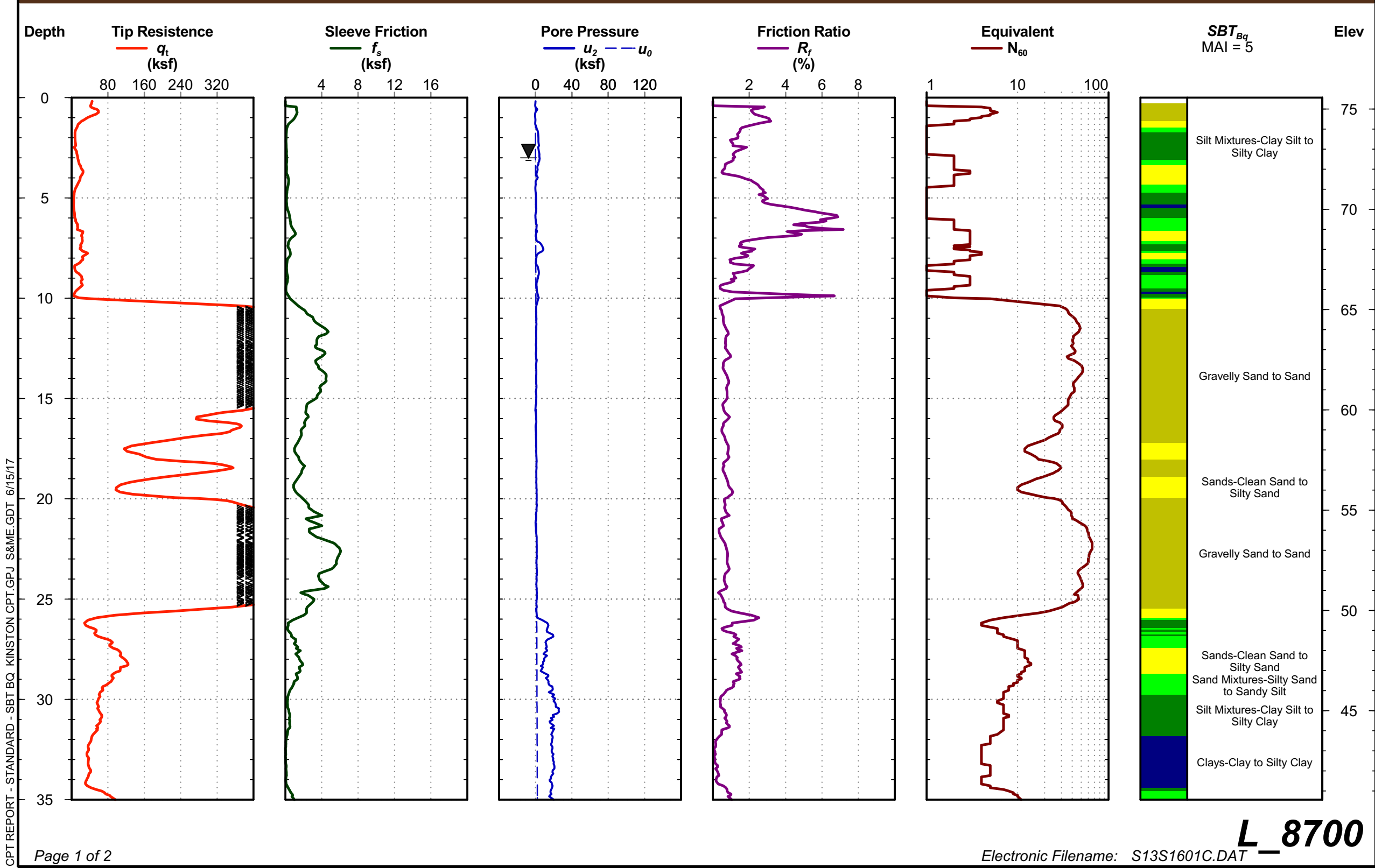
# Cone Penetration Test

## L\_8700

Date: Sep. 13, 2016  
Estimated Water Depth: 3  
Rig/Operator: Marooka/Mike | Lajay

Station: 87+00  
Offset: 0  
Elevation: 75.57

Total Depth: 37.0  
Termination Criteria: Maximum Reaction Force  
Cone Size: 1.75



Date: Sep. 13, 2016

Estimated Water Depth: 3

Rig/Operator: Marooka/Mike | Lajay

Station: 87+00

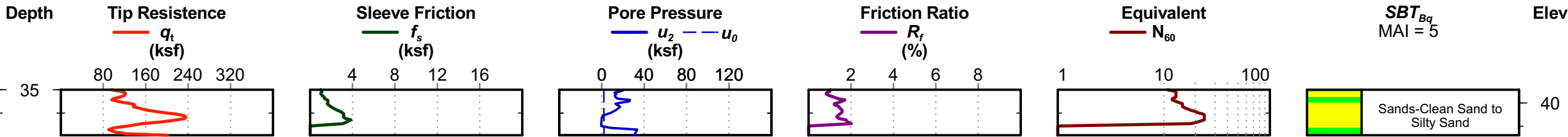
Offset: 0

Elevation: 75.57

Total Depth: 37.0

Termination Criteria: Maximum Reaction Force

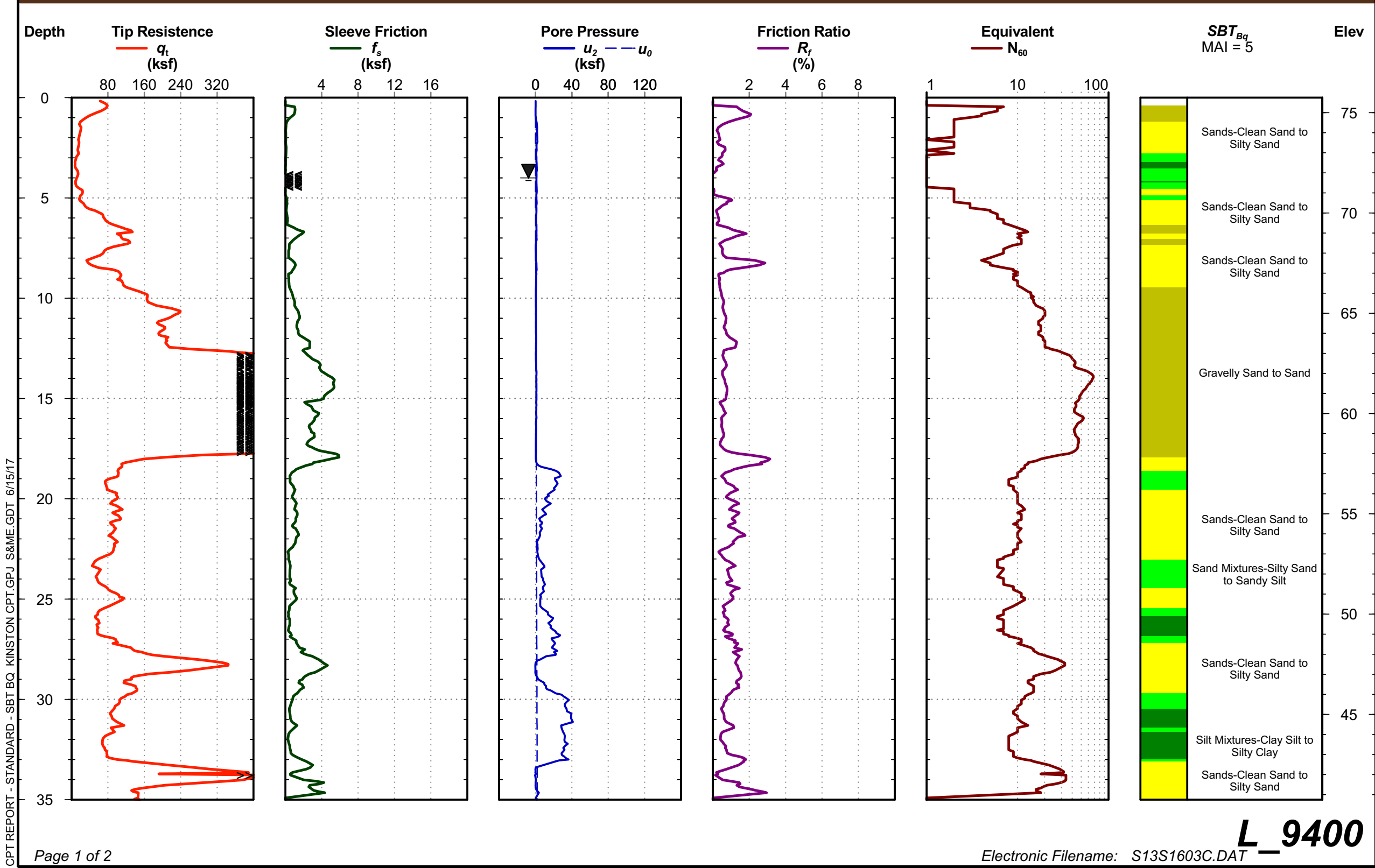
Cone Size: 1.75



Date: Sep. 13, 2016  
Estimated Water Depth: 4  
Rig/Operator: Marooka/Mike | Lajay

Station: 94+00  
Offset: 25' RT  
Elevation: 75.75

Total Depth: 35.1  
Termination Criteria: Target Depth  
Cone Size: 1.75



PROJECT: 46375

REFERENCE: R-5703

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT  
**SUBSURFACE INVESTIGATION**  
APPENDIX B  
LABORATORY RESULTS

PROJECT REFERENCE NO.	SHEET NO.
R-5703	235

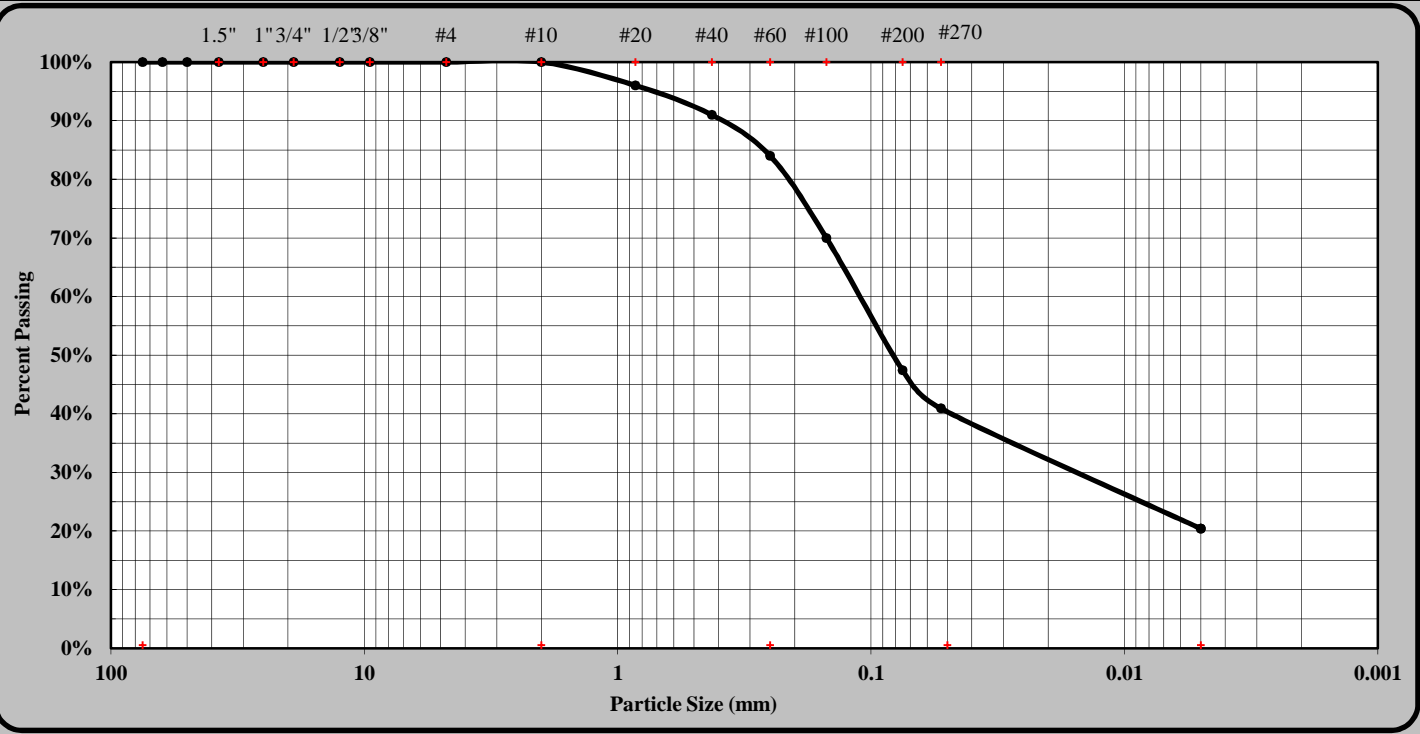
INITIALS	DATE
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/14/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/14/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-RT-8945	Sample #:	SS-7
Location:	89+45	Sample Date:	8/8/16
		Offset:	33' RT
		Depth (ft):	1.0 - 2.5
Sample Description:	Gray Coarse to Fine Sandy Clayey SILT A-4 (1)		



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#4	Coarse Sand	16%	Silt	21%
Gravel	0%	Fine Sand	43%	Clay	20%
Apparent Relative Density	ND	Moisture Content	13.4%	% Passing #200	47.4%
Liquid Limit	21	Plastic Limit	13	Plastic Index	8
Soil Mortar (-#10 Sieve)					
Coarse Sand	16%	Fine Sand	43%	Silt	21%
				Clay	20%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>		Angular	<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.


Mal Krajan, ET  
Technician Name

104-01-0703  
Certification No.

Laboratory Manager  
Position

11/14/2016  
Date

Mal Krajan, ET  
Technical Responsibility

  
Signature

Laboratory Manager  
Position

11/14/2016  
Date

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S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616			
Project #:	6235-16-010	Report Date:	10/21/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/18 - 10/21/16
Client Name:	Michael Baker Engineering		
Client Address:	Raleigh, NC		
Boring #:	L-RT-8945	Sample #:	SS-7
Location:	89+45	Sample Date:	8/8/16
		Offset:	33' RT
		Depth (ft):	1.0 - 2.5
Sample Description:	Gray Coarse to Fine Sandy Clayey SILT (A-4) (1)		

Equipment:	Balance: 0.01 g.Readability, 500g. Minimum Capaccity		
Balance:	S&ME ID #:	1024	Cal. Date: 11/06/16
			Due: 11/06/17

Method A: Moisture Content Determination  
Required Oven Temperature:105 ± 5° C

Oven Temperature: 105 °C		Tare #	h
t	Tare Weight (Dish plus Aluminum Foil Cover)	grams	45.60
a	Mass of As-Received Specimen + Tare Wt.	grams	91.99
b	Mass of Oven Dry Specimen + Tare Wt.	grams	86.51
w	Water Weight	(a-b)	5.48
A	Mass of As-Received Specimen	(a-t)	46.39
B	Mass of Oven Dry Specimen	(b-t)	40.91
% Moisture Content as a % of As Received or Total Mass		(w/A)*100	11.8%
% Moisture Content as a % of Oven-dried Mass		(w/B)*100	13.4%

Oven S&ME ID #: 1454 Cal. Date: 10/7/16 Due: 10/7/17


Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination

Muffle Furnace: 455 °C		Tare #	84
t	Tare Weight (Dish plus Aluminum Foil Cover)	grams	49.60
b	Mass of Oven Dry Specimen + Tare Wt.	grams	85.32
c	Ash Weight + Tare Wt.	grams	84.68
C	Ash Weight	c-t	35.08
B	Mass of Oven Dry Specimen	(b-t)	35.72
D	% Ash Content	(C/B)*100	98.2%
	% Organic Matter	100-D	1.8%

Muffle Furnace: S&ME ID #: 00261

Notes / Deviations / References:

Mal Krajan, ET  
Technical Responsibility

  
Signature

Laboratory Manager  
Position

11/14/2016  
Date

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pH of Soil

AASHTO T289

Quality Assurance



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616							
Project #:	6235-16-010	Report Date:	11/7/16				
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/5 - 11/7/16				
Client Name:	Michael Baker Engineering						
Client Address:	Raleigh, NC						
Boring #:	L-RT-8945	Sample #:	SS-7	Sample Date:	8/8/16		
Location:	89+45	Offset:	33' RT	Depth (ft):	1.0 - 2.5		
Sample Description: Gray Coarse to Fine Sandy Clayey SILT (A-4) (1)							
Equipment:							
Balance	S&ME ID#	1024	Cal. Date:	11/6/16	Due:	11/6/17	
Sieve:	#10	S&ME ID#	13223	Cal. Date:	6/11/16	Due:	6/11/17
pH Meter:		S&ME ID#	1365	Cal. Date:	11/7/16	Due:	NA

pH Meter Calibration

Buffer Solution	Results
pH buffer 7.0	7.02
pH buffer 4.01	4.01
pH buffer 10.0	10.03
Buffer Temperature °C	22.4

Measuring pH of Soil

Measurements	
Weightt of Air Dry Soil (g)	30.00
Distilled Water (g)	30.01
Temperature °C	22.2
pH Readings	5.69

Notes / Deviations / References: AASHTO T-289: Determining pH of Soil for Use in Corrosion Testing

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

11/14/2016

Date

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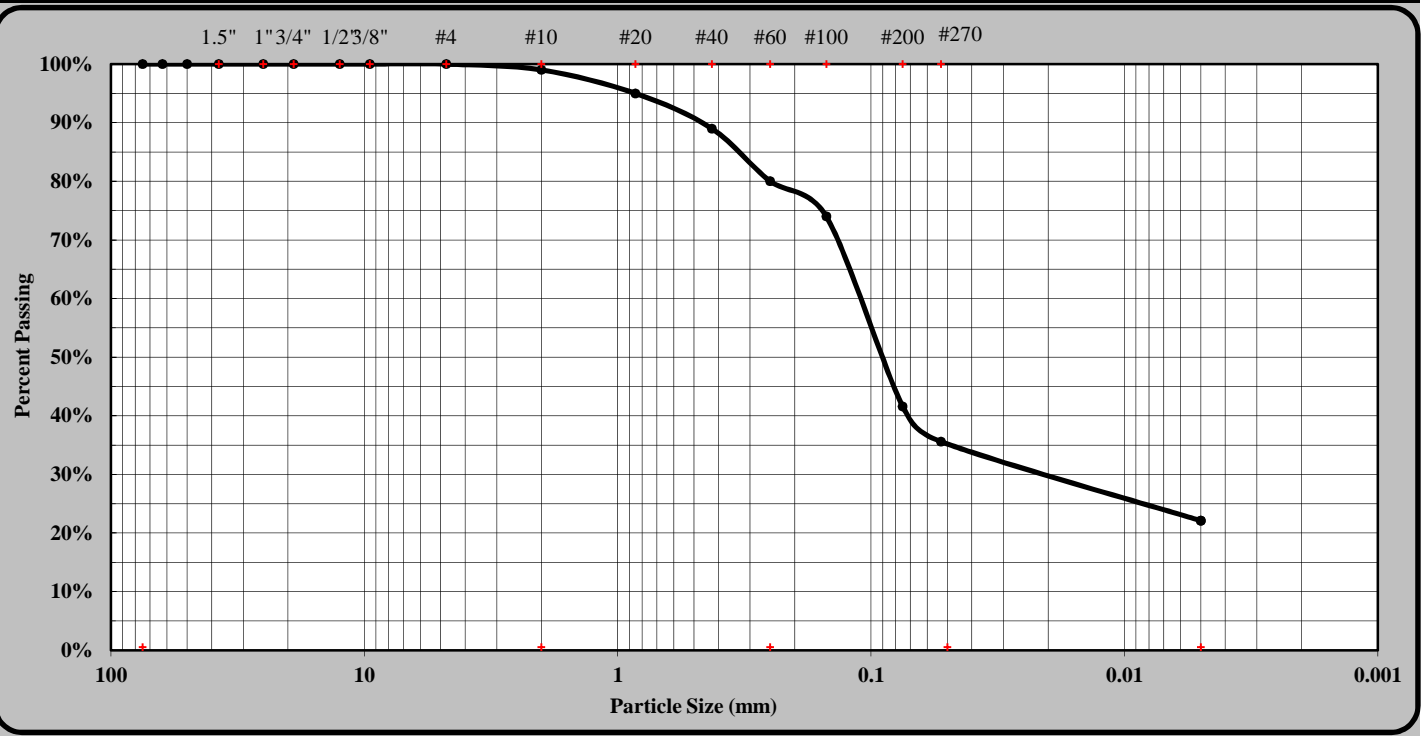
Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/14/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/14/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-9300	Sample #:	SS-8
Location:	93+00	Sample Date:	9/22/16
		Offset:	CL
		Depth (ft):	4.0 - 5.5
Sample Description:	Gray Coarse to Fine Sandy Silty CLAY A-4 (0)		



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#10	Coarse Sand	19%	Silt	14%
Gravel	1%	Fine Sand	44%	Clay	22%
Apparent Relative Density	ND	Moisture Content	17.7%	% Passing #200	41.6%
Liquid Limit	22	Plastic Limit	17	Plastic Index	5
Soil Mortar (-#10 Sieve)					
Coarse Sand	19%	Fine Sand	45%	Silt	14%
				Clay	22%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>		Angular	<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET

Technical Name

104-01-0703

Certification No.

Laboratory Manager

Position

10/7/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

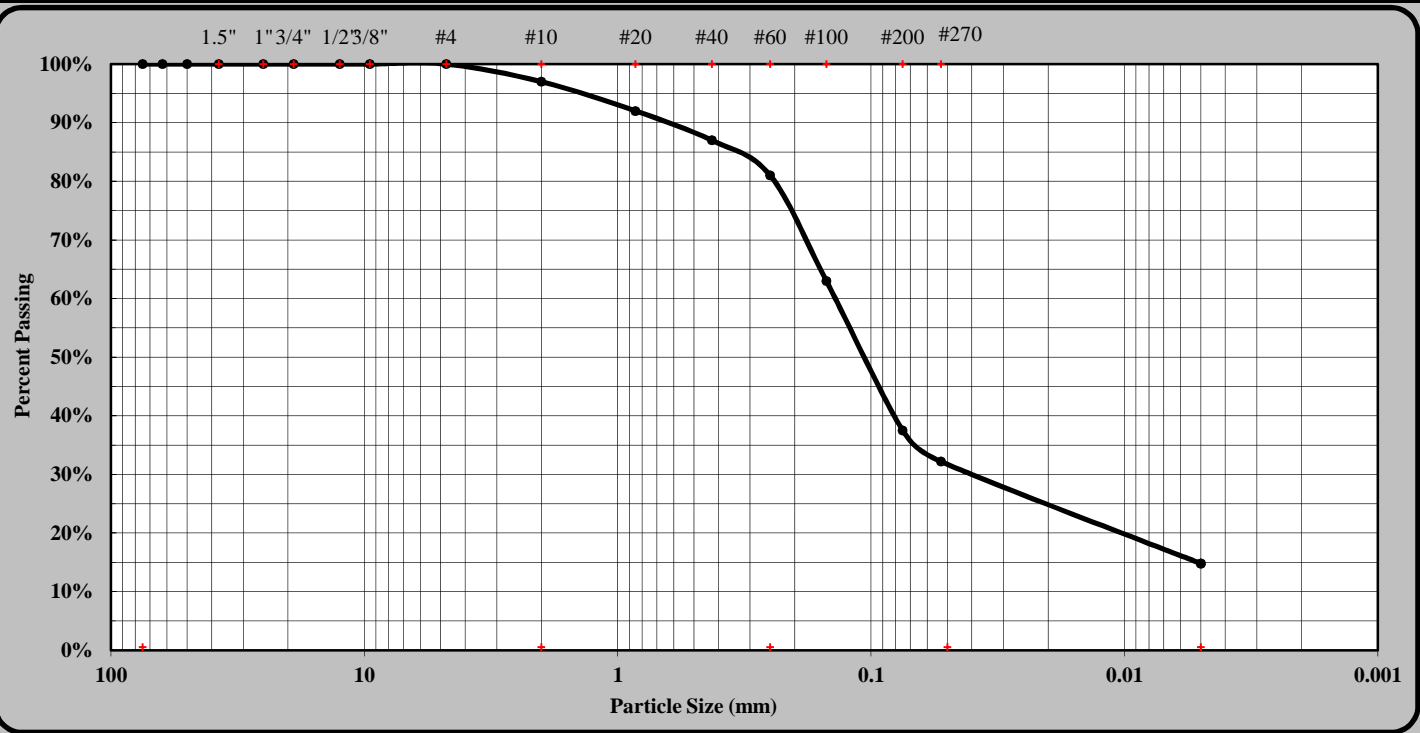
Position

11/14/2016

Date


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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/3/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/15/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-9900	Sample #:	SS-9
Location:	99+00	Sample Date:	9/21/16
		Offset:	CL
		Depth (ft):	2.5 - 4.0
Sample Description:	Tan Coarse to Fine Sandy Clayey SILT A-4 (0)		



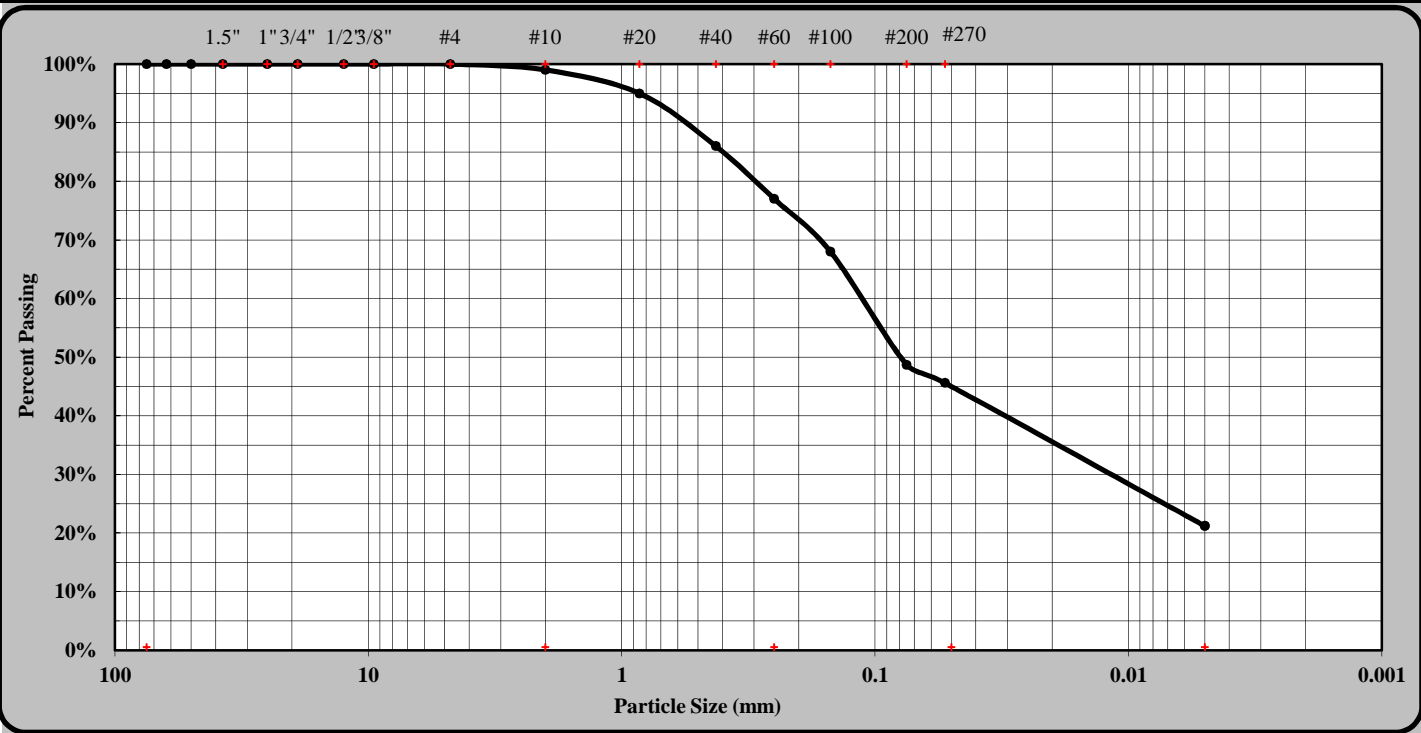
As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	3/8"	Coarse Sand	16%	Silt	17%
Gravel	3%	Fine Sand	49%	Clay	15%
Apparent Relative Density	ND	Moisture Content	16.5%	% Passing #200	37.5%
Liquid Limit	20	Plastic Limit	15	Plastic Index	5
Soil Mortar (-#10 Sieve)					
Coarse Sand	17%	Fine Sand	50%	Silt	18%
				Clay	15%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>
Hard & Durable		Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	11/3/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	9/26/2016
Technical Responsibility	Signature	Position	Date


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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/3/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/15/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-10500	Sample #:	SS-10
Location:	105+00	Sample Date:	9/15/16
		Offset:	CL
		Depth (ft):	0.5 - 2.0
Sample Description:	Dark Gray Coarse to Fine Sandy Clayey SILT A-4 (2)		



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	3/8"	Coarse Sand	22%	Silt	24%
Gravel	1%	Fine Sand	31%	Clay	21%
Apparent Relative Density	ND	Moisture Content	45.4%	% Passing #200	48.7%
Liquid Limit	30	Plastic Limit	21	Plastic Index	9
Soil Mortar (-#10 Sieve)					
Coarse Sand	22%	Fine Sand	32%	Silt	25%
				Clay	21%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>
Hard & Durable		Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	11/3/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	9/26/2016
Technical Responsibility	Signature	Position	Date

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### Quality Assurance

*Revision Date: 11/21/07*

8b.L-11100 Bulk S-11 (1 - 3 ft) Proctor.xls  
Page 3 of 3



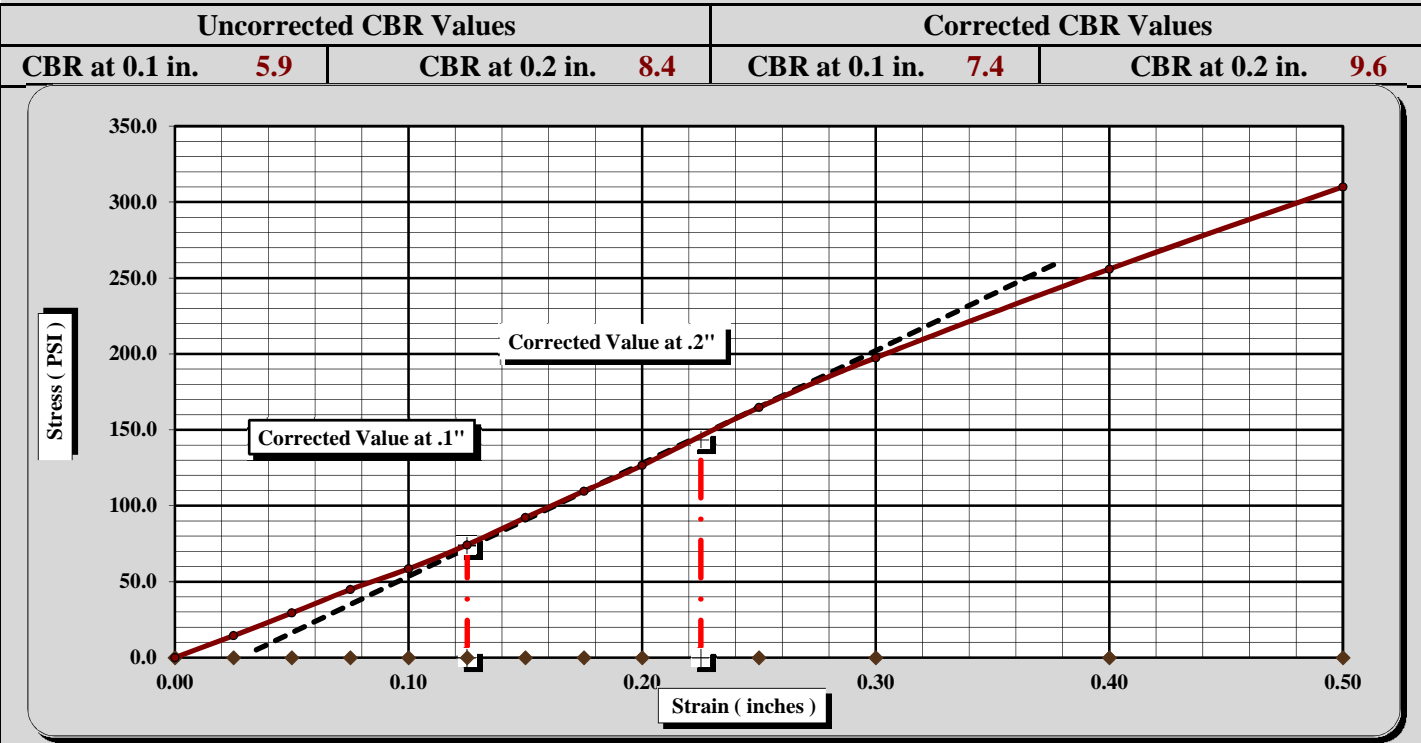
CBR (California Bearing Ratio) of Laboratory  
Compacted Soil

AASHTO T 193



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
Project #:	6235-16-010	Report Date:	10/12/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s)	10/5 - 10/12/16
Client Name:	Michael Baker		
Client Address:	Cary, NC		
Boring #:	L-11100	Sample #:	CBR-1
Location:	111+00	Offset:	2' RT
		Depth (ft):	1.0 - 3.0 ft
Sample Description: Gray Coarse to Fine Sandy Silty CLAY (A-6) (2)			
AASHTO T99 Method A		Maximum Dry Density:	122.4 PCF
		Optimum Moisture Content:	10.1%
		Compaction Test performed on grading complying with CBR spec.	
		% Retained on the 3/4" sieve: 0.0%	



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	65	Final Dry Density (PCF)	122.3
Initial Dry Density (PCF)	122.6	Average Final Moisture Content	10.6%
Moisture Content of the Compacted Specimen	10.6%	Moisture Content (top 1" after soaking)	11.2%
Percent Compaction	100.2%	Percent Swell	0.2%
Soak Time:	96-hr	Surcharge Weight	10.0
		Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	25	Plastic Index	13

Notes/Deviations/References:

Test specimen was compacted to 100% at optimum moisture content.

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

10/12/2016

Date

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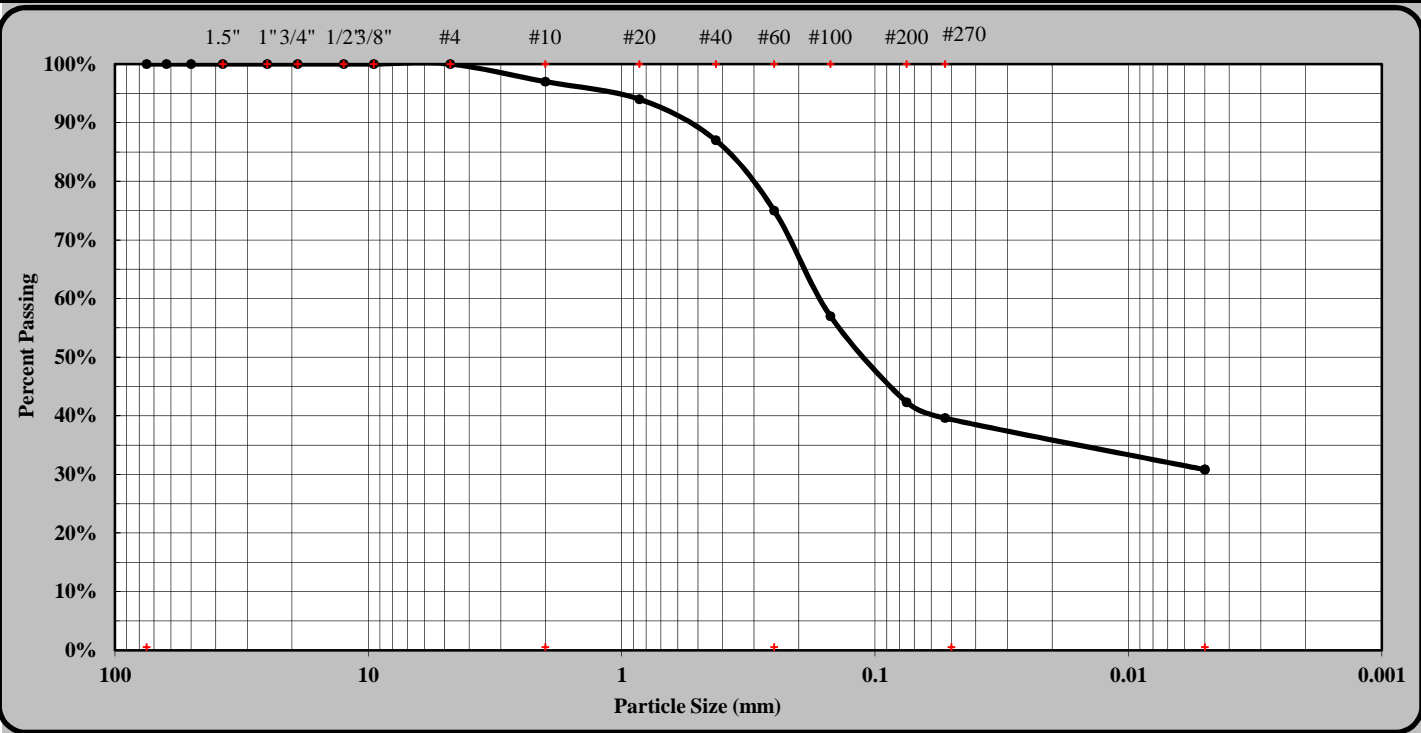
Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/3/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/15/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-11100	Sample #:	SS-12
Location:	111+00	Offset:	CL
		Depth (ft):	2.5 - 4.0
Sample Description:		Gray Coarse to Fine Sandy Silty CLAY A-6 (1)	



As Defined by NCDOT			Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm		Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm		Clay		< 0.005 mm	
Maximum Particle Size	#4	Coarse Sand	22%	Silt	9%	
Gravel	3%	Fine Sand	35%	Clay	31%	
Apparent Relative Density	ND	Moisture Content	18.4%	% Passing #200	42.3%	
Liquid Limit	28	Plastic Limit	17	Plastic Index	11	
Soil Mortar (-#10 Sieve)						
Coarse Sand	23%	Fine Sand	36%	Silt	9%	Clay 32%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular		<input type="checkbox"/>
Hard & Durable		<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable <input type="checkbox"/>	

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

Position

11/3/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

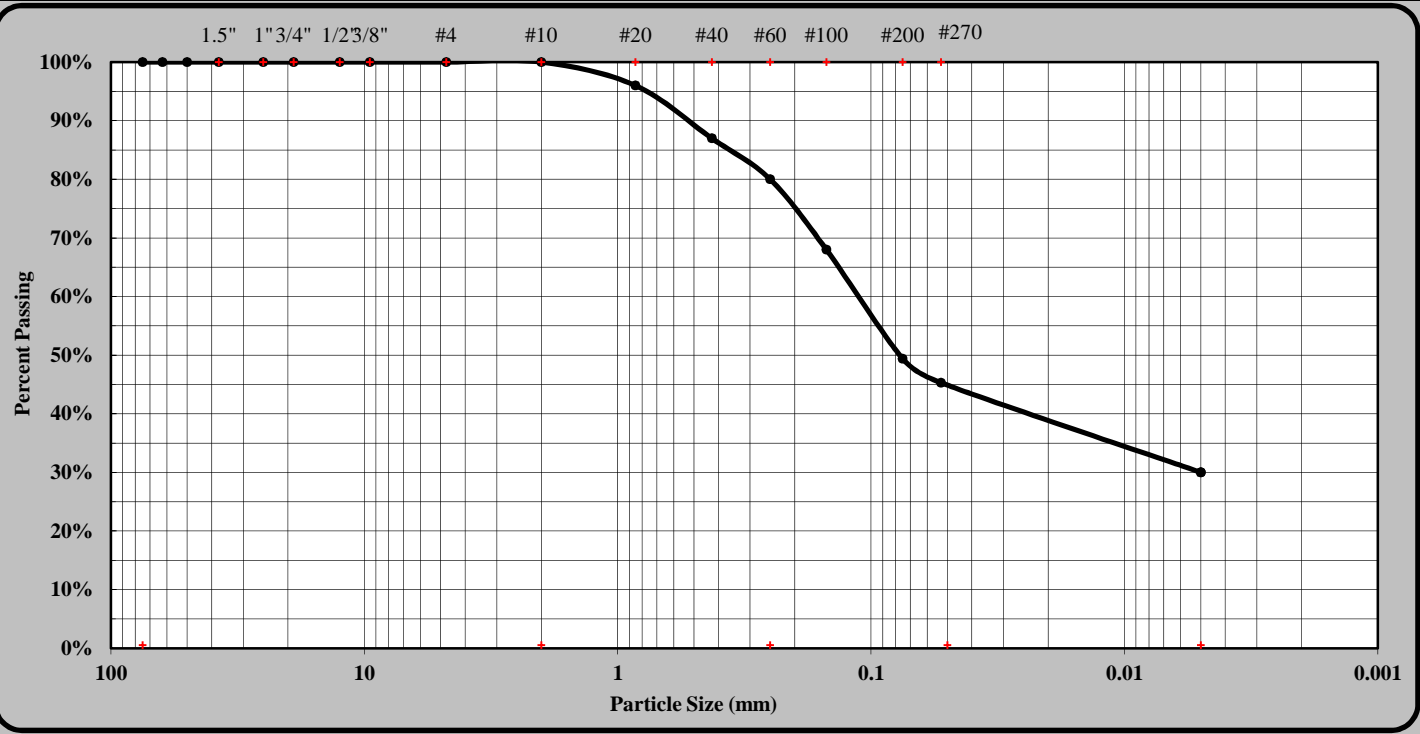
9/26/2016

Date

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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/14/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/14/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-13500	Sample #:	SS-15
Location:	135+00	Sample Date:	9/27/16
		Offset:	CL
		Depth (ft):	2.5 - 4.0
Sample Description:	Gray Coarse to Fine Sandy Silty CLAY A-6 (3)		

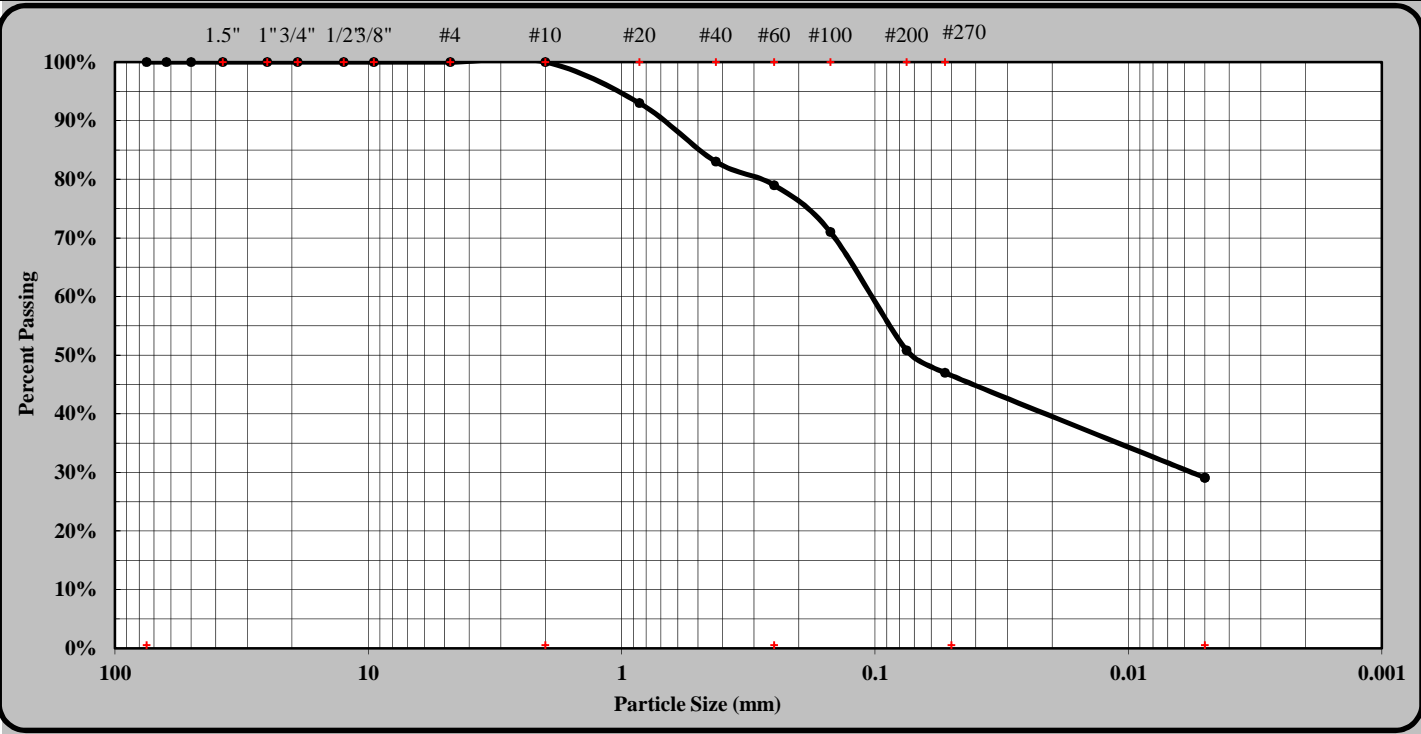


As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#4	Coarse Sand	20%	Silt	15%
Gravel	0%	Fine Sand	35%	Clay	30%
Apparent Relative Density	ND	Moisture Content	21.8%	% Passing #200	49.4%
Liquid Limit	26	Plastic Limit	14	Plastic Index	12
Soil Mortar (-#10 Sieve)					
Coarse Sand	20%	Fine Sand	35%	Silt	15%
				Clay	30%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>	
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.


Mal Krajan, ET	104-01-0703	Laboratory Manager	10/4/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	11/14/2016
Technical Responsibility	Signature	Position	Date
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/8/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/1- 11/8/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-14400	Sample #:	SS-16
Location:	144+00	Sample Date:	9/28/16
		Offset:	CL
		Depth (ft):	2.0-3.5'
Sample Description:	Tan Light Brown CLAY A-6 (5)		

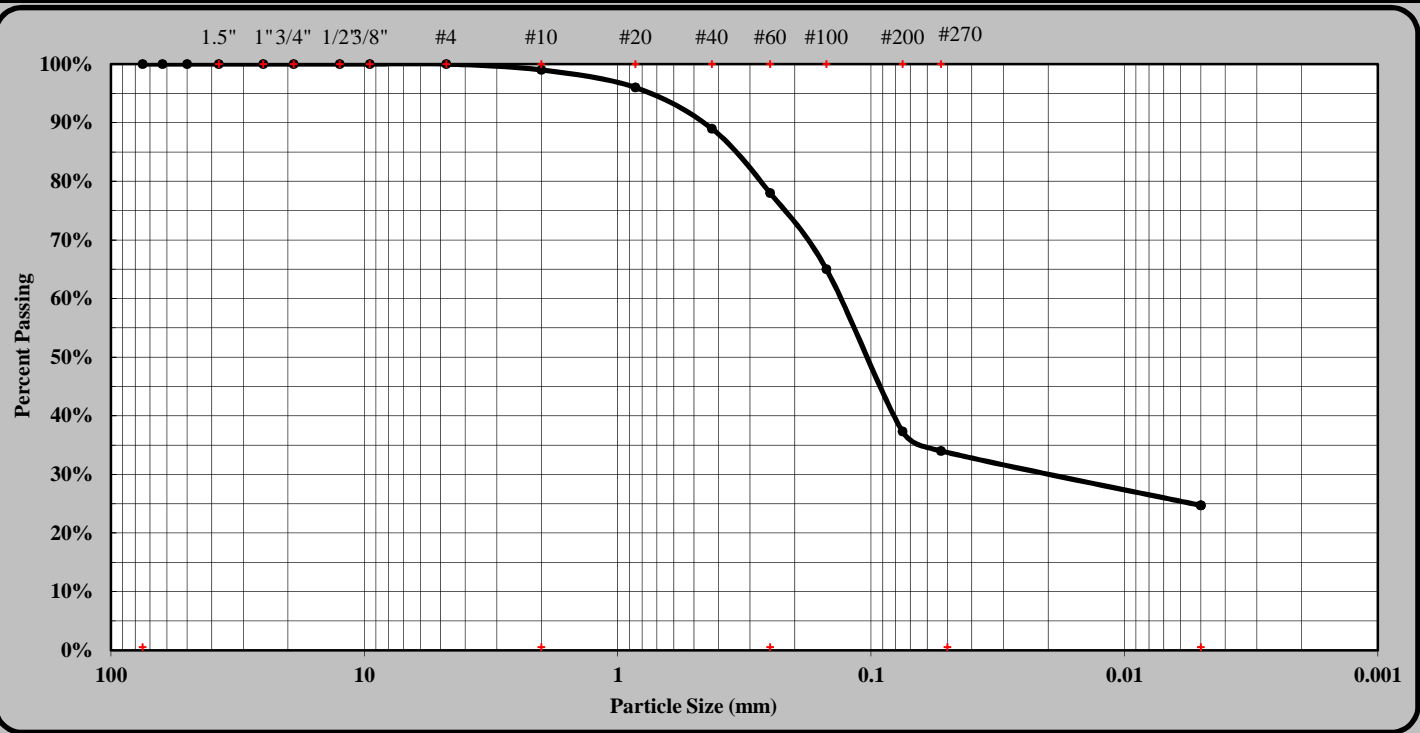


As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#20	Coarse Sand	21%	Silt	18%
Gravel	0%	Fine Sand	32%	Clay	29%
Apparent Relative Density	2.650	Moisture Content	17.7%	% Passing #200	50.8%
Liquid Limit	32	Plastic Limit	15	Plastic Index	17
Soil Mortar (-#10 Sieve)					
Coarse Sand	21%	Fine Sand	32%	Silt	18%
				Clay	29%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>	
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Karen Warner	118-06-0305	Laboratory Technician	11/8/2016
Technician Name	Certification No.	Position	Date
Stewart Laney, P.E		Senior Engineer	
Technical Responsibility	Signature	Position	Date
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/3/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/15/16
State Project #:	46375.1.1	F.A. Project No:	N/A
		TIP NO:	R-5703
Client Name:	Michael Baker Engineering		
Address:	Raleigh, NC		
Boring #:	L-15000	Sample #:	SS-17
		Sample Date:	9/22/16
Location:	150+00	Offset:	CL
		Depth (ft):	2.5 - 4.0
Sample Description:	Tan Coarse to Fine Sandy Silty CLAY A-6 (1)		



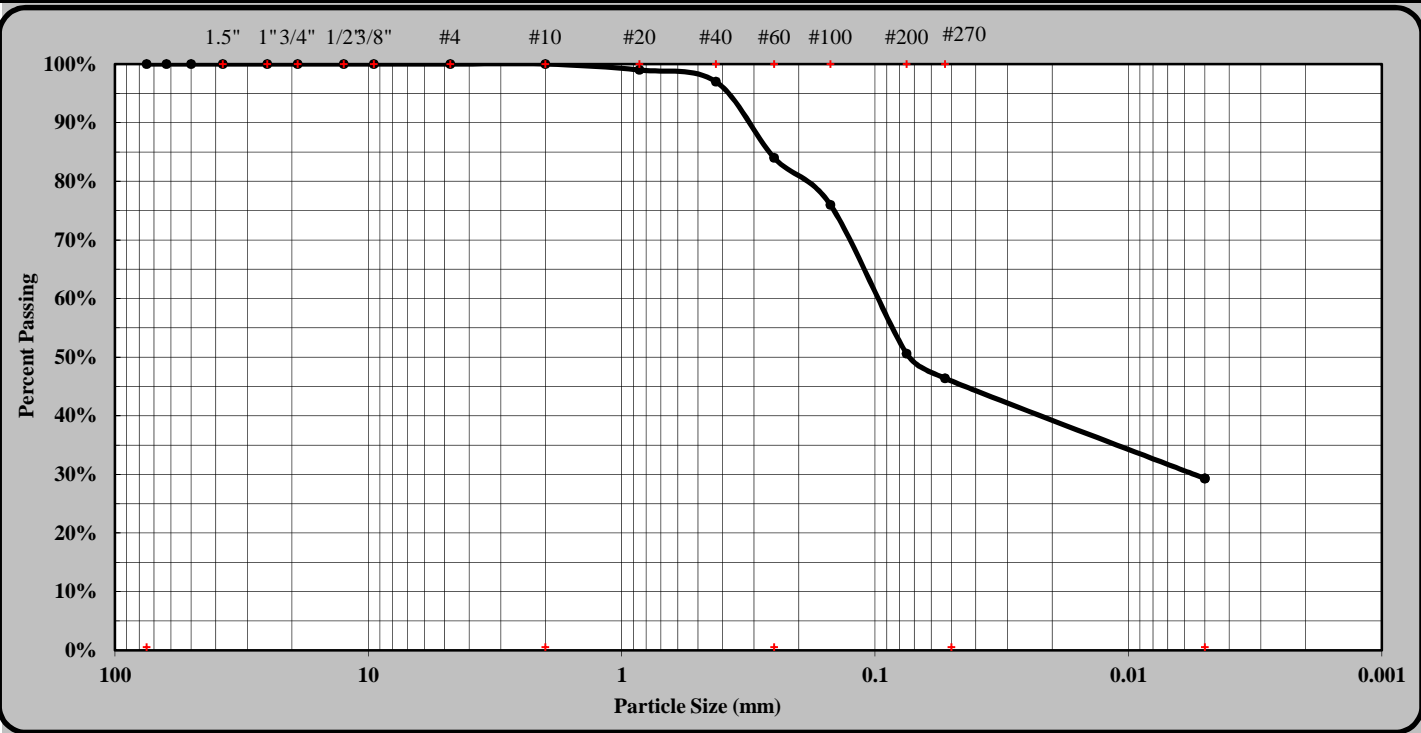
As Defined by NCDOT			Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm		Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm		Clay		< 0.005 mm	
Maximum Particle Size	#4	Coarse Sand	21%	Silt	9%	
Gravel	1%	Fine Sand	44%	Clay	25%	
Apparent Relative Density	ND	Moisture Content	16.3%	% Passing #200	37.3%	
Liquid Limit	30	Plastic Limit	15	Plastic Index	15	
Soil Mortar (-#10 Sieve)						
Coarse Sand	21%	Fine Sand	45%	Silt	9%	Clay 25%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular		<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable		<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	11/3/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	9/26/2016
Technical Responsibility	Signature	Position	Date

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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/14/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/14/16
State Project #:	46375.1.1	F.A. Project No:	N/A
		TIP NO:	R-5703
Client Name:	Michael Baker Engineering		
Address:	Raleigh, NC		
Boring #:	L-15300	Sample #:	CBR-2
		Sample Date:	9/23/16
Location:	153+00	Offset:	2' RT
		Depth (ft):	1.0 - 2.0
Sample Description:	Gray Coarse to Fine Sandy Silty CLAY A-6 (3)		



As Defined by NCDOT			Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm		Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm		Clay		< 0.005 mm	
Maximum Particle Size	#10	Coarse Sand	16%	Silt	17%	
Gravel	0%	Fine Sand	38%	Clay	29%	
Apparent Relative Density	ND	Moisture Content	16.9%	% Passing #200	50.6%	
Liquid Limit	26	Plastic Limit	12	Plastic Index	14	
Soil Mortar (-#10 Sieve)						
Coarse Sand	16%	Fine Sand	38%	Silt	17%	Clay 29%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular		<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable		<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	10/7/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	11/14/2016
Technical Responsibility	Signature	Position	Date

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Form No. TR-D698-2

Revision No. : 0

Revision Date: 11/21/07

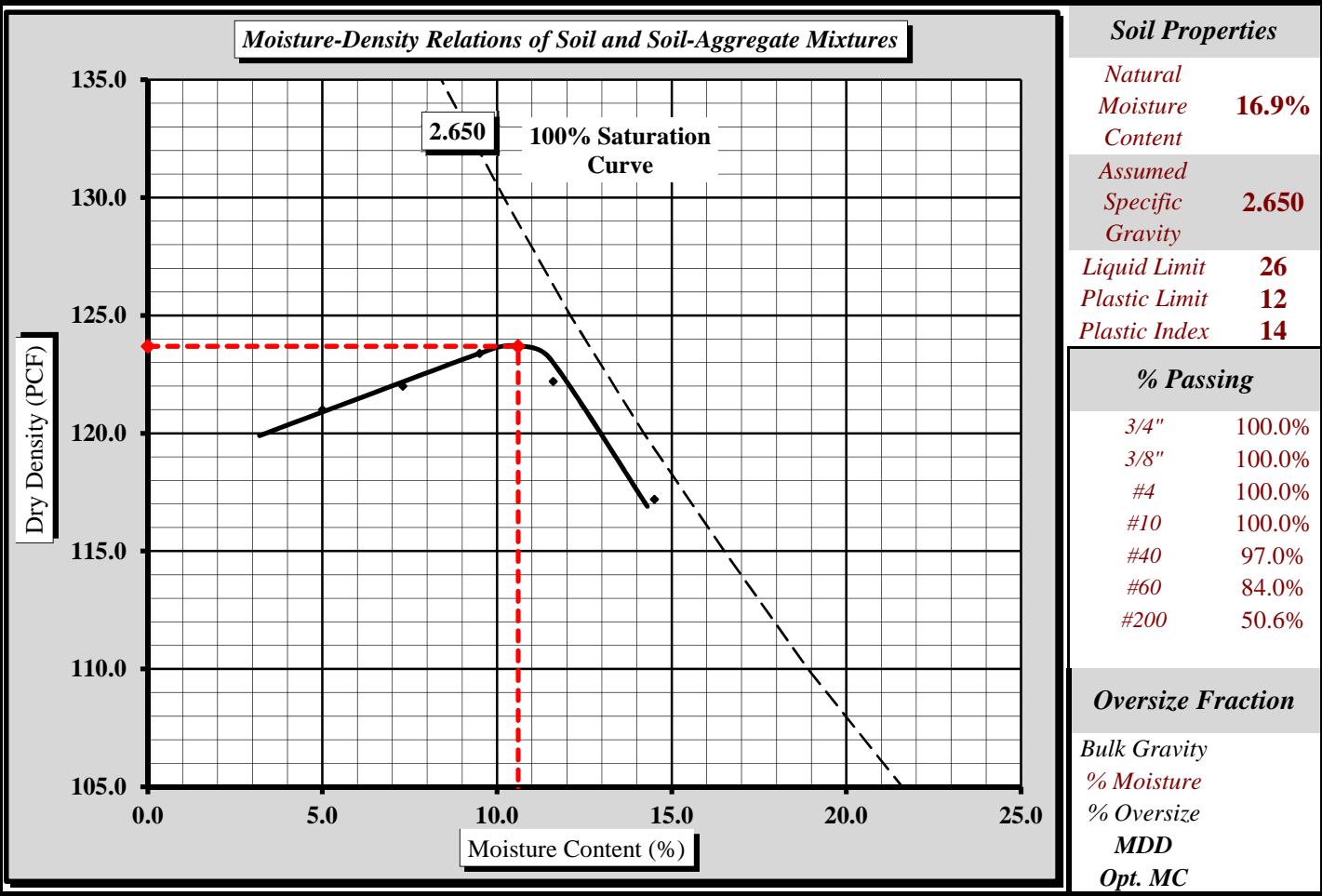
Moisture - Density Report



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	10/7/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	9/30 - 10/7/16
Client Name:	Michael Baker		
Client Address:	Cary, NC		
Boring #:	L-15300	Sample #:	CBR-2
Location:	153+00	Offset:	2' RT
Sample Description:	Gray Coarse to Fine Sandy Silty CLAY (A-6) (3)		
Sample Date:	9/23/2016	Depth:	1.0 - 2.0 ft

Maximum Dry Density	123.7	PCF.	Optimum Moisture Content	10.6%
AASHTO T99 - - Method A				



Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐  
Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐  
Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: ND=Not Determined.  
ASTM D 422: Particle Size Analysis of Soils  
ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass  
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Mal Krajan, ET		Laboratory Manager	
Technical Responsibility	Signature	Position	Date
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Form No. TR-D1833-T193-3

Revision No. 0

Revision Date: 2/6/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

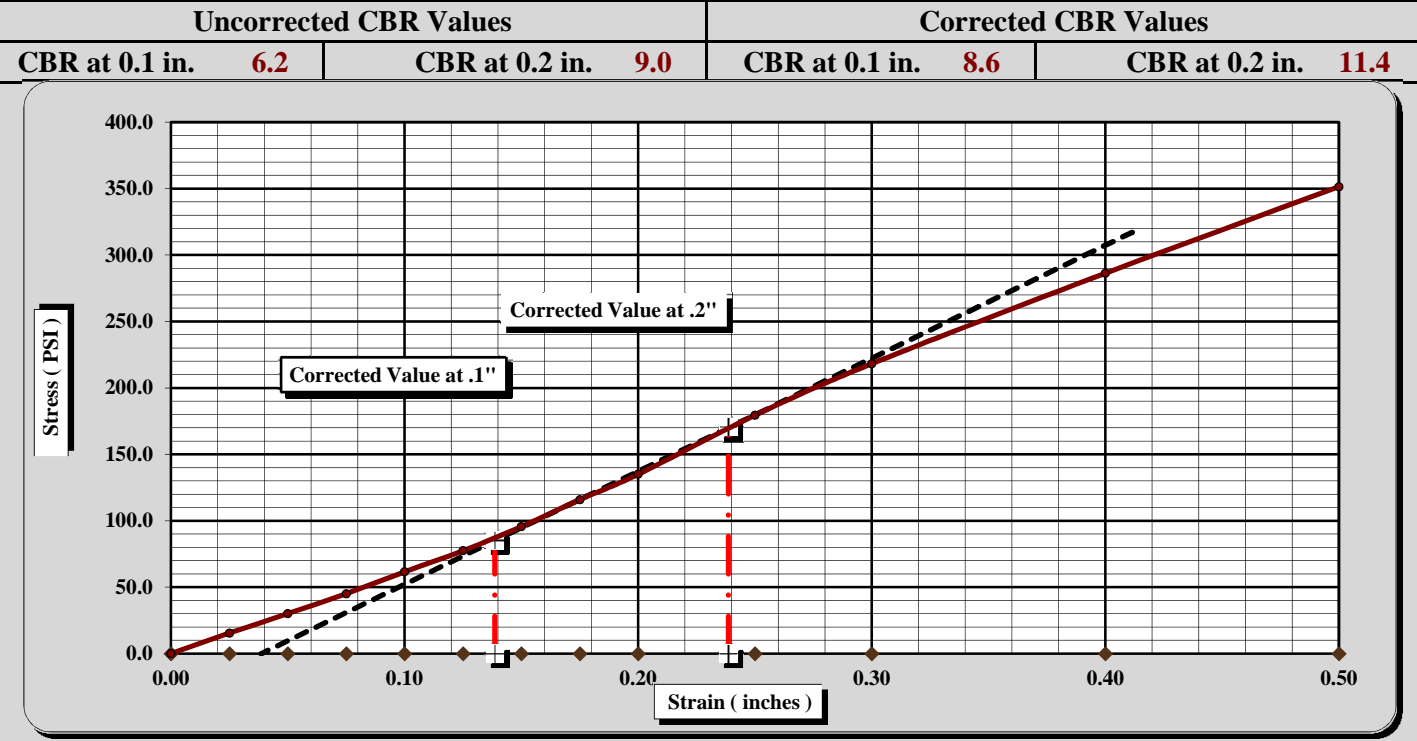
AASHTO T 193



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
Project #:	6235-16-010	Report Date:	10/12/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s)	10/5 - 10/12/16
Client Name:	Michael Baker		
Client Address:	Cary, NC		
Boring #:	L-15300	Sample #:	CBR-2
Location:	153+00	Offset:	2' RT
Sample Description:	Gray Coarse to Fine Sandy Silty CLAY (A-6) (3)		
Sample Date:	9/23/16	Depth (ft):	1.0 -2.0 ft

AASHTO T99 Method A	Maximum Dry Density:	123.7	PCF	Optimum Moisture Content:	10.6%
Compaction Test performed on grading complying with CBR spec.				% Retained on the 3/4" sieve:	0.0%



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	65	Final Dry Density (PCF)	123.4
Initial Dry Density (PCF)	123.7	Average Final Moisture Content	10.4%
Moisture Content of the Compacted Specimen	10.1%	Moisture Content (top 1" after soaking)	10.7%
Percent Compaction	100.0%	Percent Swell	0.0%
Soak Time:	96-hr	Surcharge Weight	10.0
Liquid Limit	26	Surcharge Wt. per sq. Ft.	50.9
		Plastic Index	12

Notes/Deviations/References:  
Test specimen was compacted to 100% at optimum moisture content.

Mal Krajan, ET		Laboratory Manager	10/12/2016
Technical Responsibility	Signature	Position	Date
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Oedometer Settlement Tests

Sample details

Sketch showing specimen location in original Sample



Depth 18.0 - 20.0 ft.  
Description: Gray Coarse to Fine Sandy Silty CLAY (A-6) (2)  
  
Type Undisturbed  
Height  $H_0$  (in) 0.996  
Diameter  $D_0$  (in) 2.501  
Weight  $W_0$  (gr) 160.41  
Bulk Density  $\rho$  (PCF) 124.89  
Particle Density  $\rho_s$  2.663 (measured)

Initial Conditions

Settlement Channel 1942  
Moisture Content  $w_0$ % 23.8  
Dry Density  $\rho_d$  (PCF) 100.84  
Voids Ratio  $e_0$  0.6478  
Deg of Saturation  $S_0$ % 98.0  
Swelling Pressure  $S_s$  (TSF) 0.000

Final Conditions

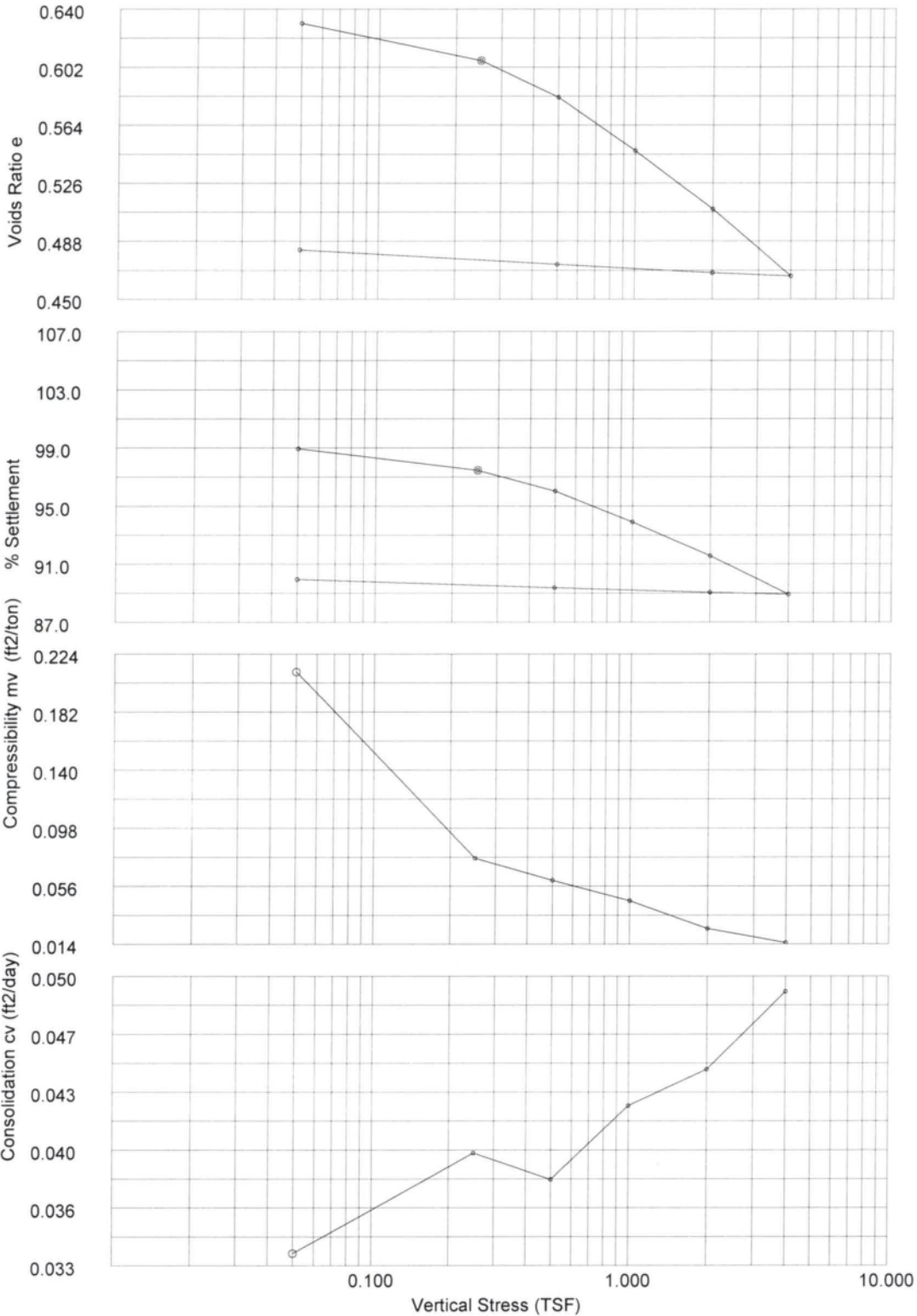
Moisture Content  $w_f$ % 19.5  
Dry Density  $\rho_d$  (PCF) 112.10  
Voids Ratio  $e_f$  0.4824  
Deg of Saturation  $S_f$ % 100.00  
Settlement: (in) 0.10  
Compression Index  $C_c$  0.162

Notes: Test specimen taken from the middle portion of UD tube.



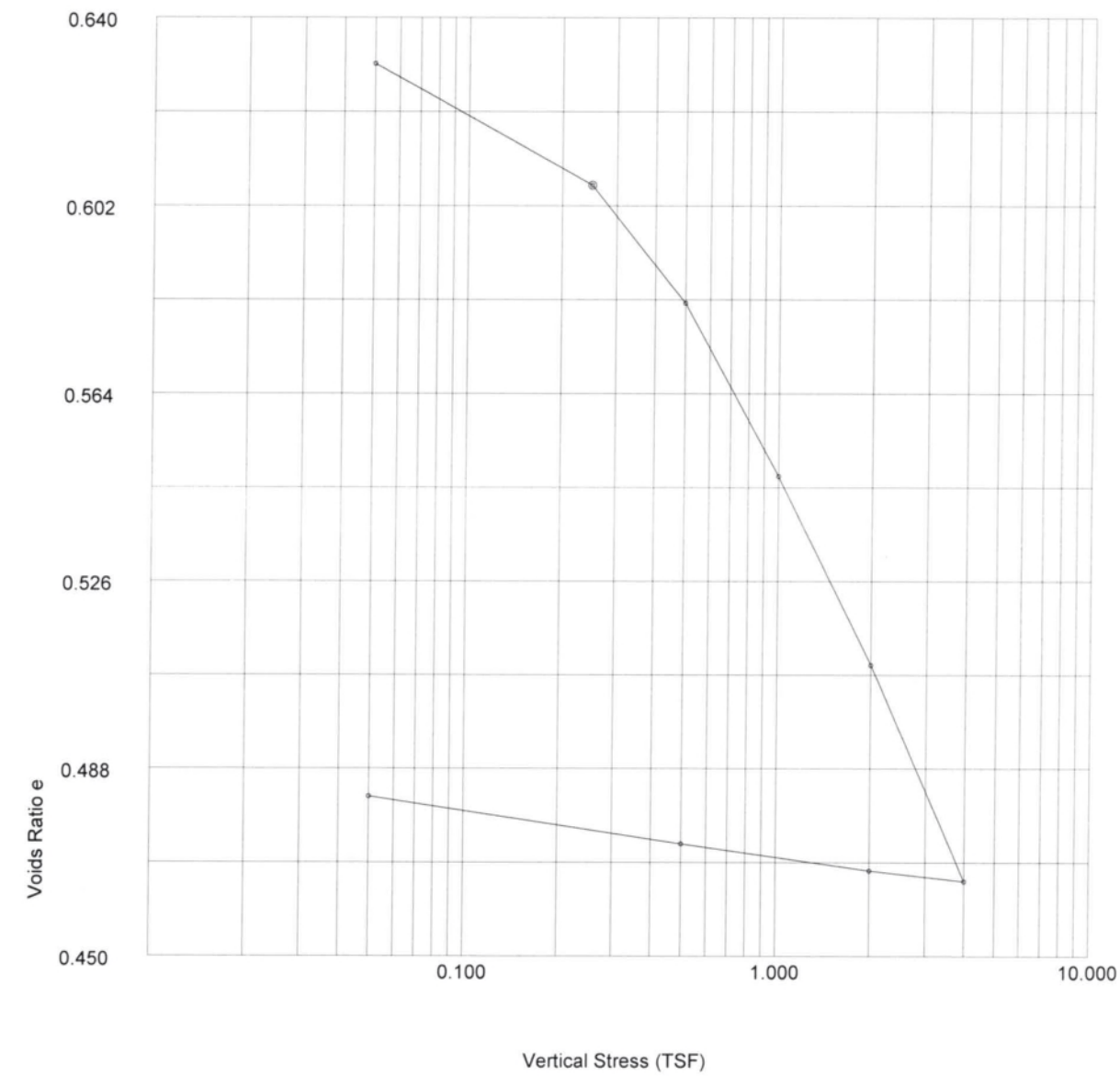
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Site Reference: C.F. Harvey	Date of Test: 12-14-16
Jobfile: E:\16010.JOB	Sample: ST-3
Operator: <i>mk</i>	Borehole: L-RT-16589
Checked: <i>mk</i>	Approved:

Oedometer Settlement Tests

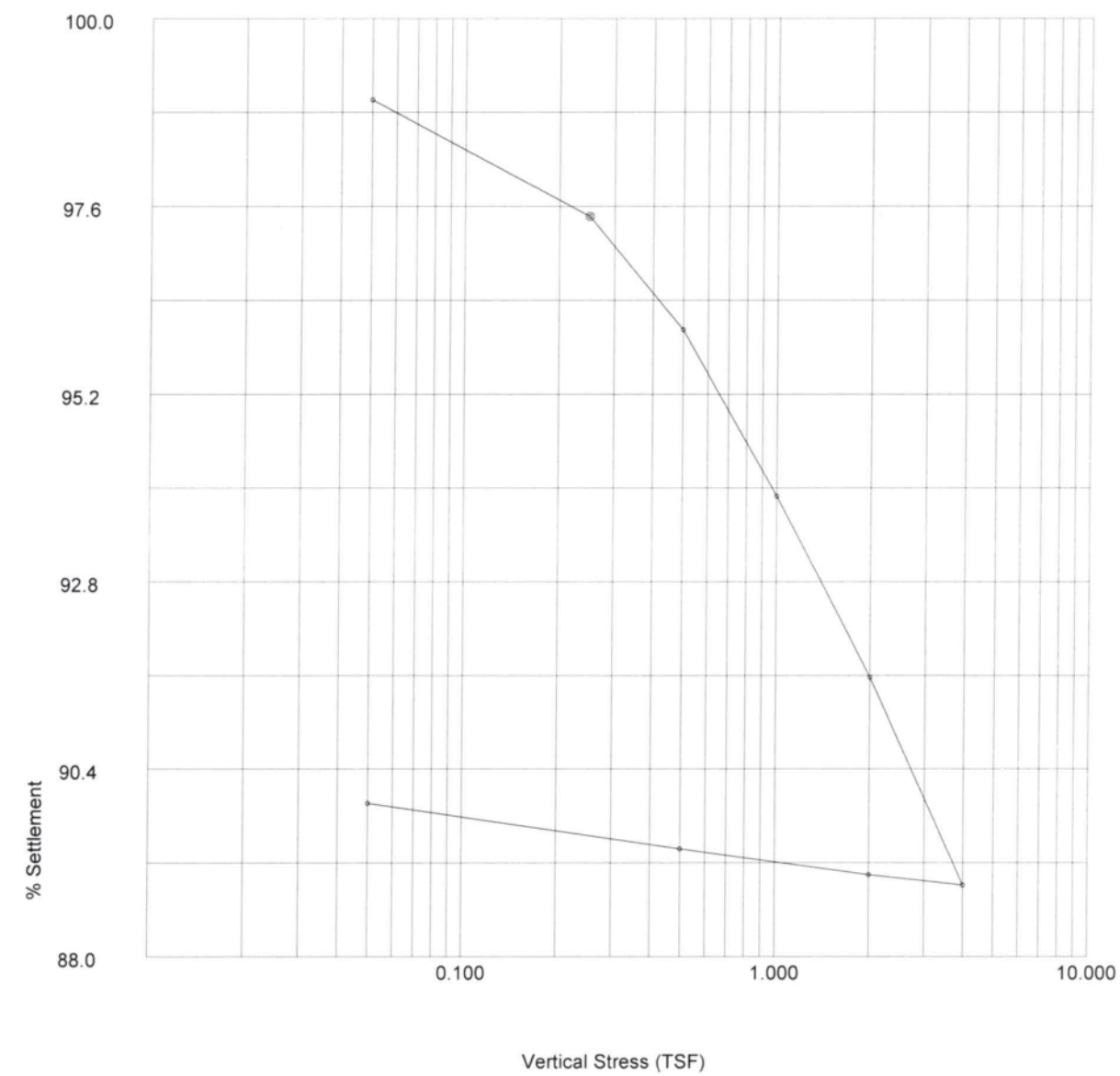


ASTM D2435-96	Test name Consolidation
Site Reference: C.F. Harvey	Date of Test: 12-14-16
Jobfile: E:\16010.JOB	Sample: ST-3
Operator: <i>mk</i>	Borehole: L-RT-16589
Checked: <i>mk</i>	Approved:

Oedometer Settlement Tests



Oedometer Settlement Tests

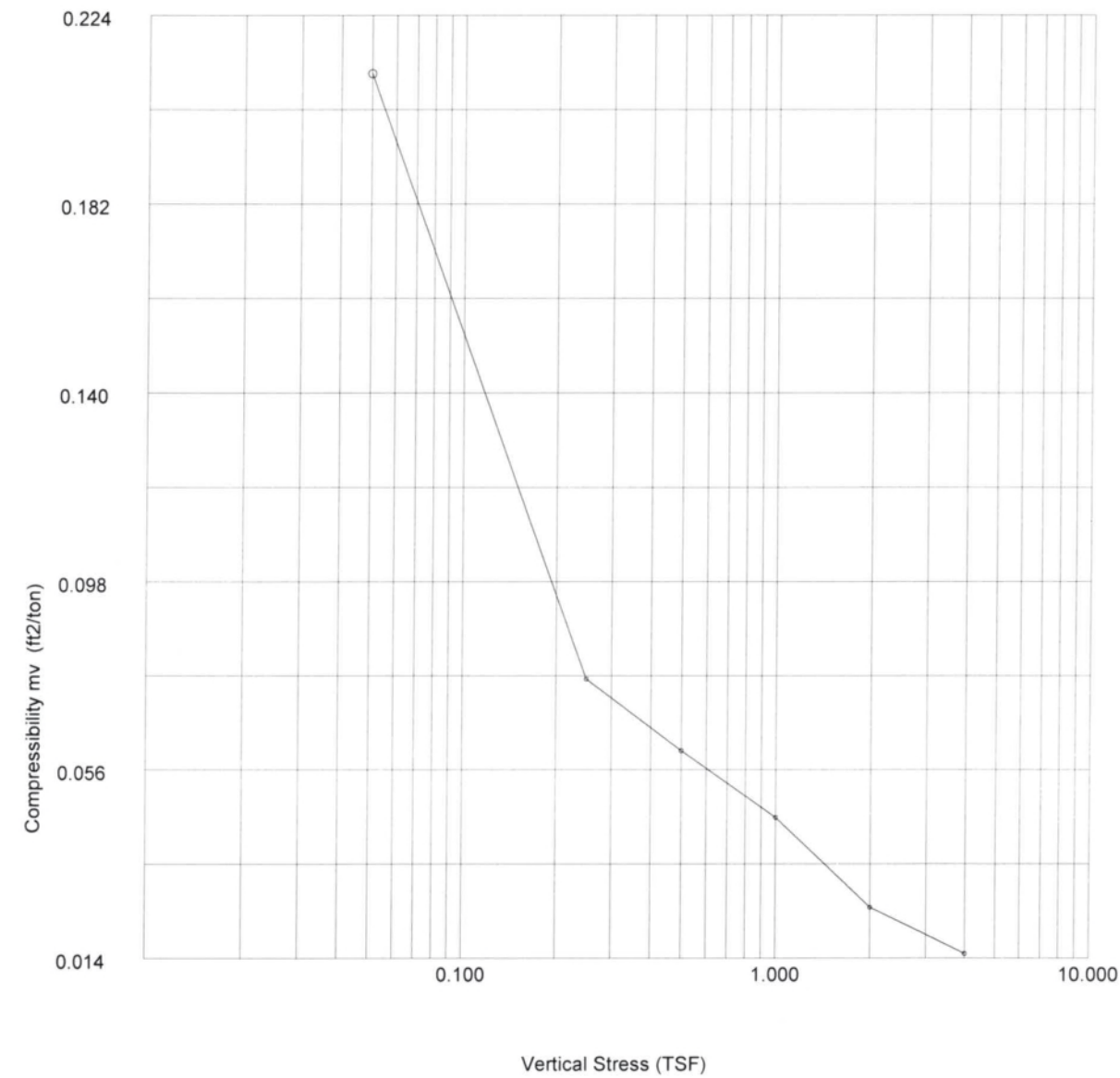


	ASTM D2435-96		Test name Consolidation		
			Date of Test: 12-14-16		
	Site Reference: C.F. Harvey		Sample: ST-3		
	Jobfile: E:\16010.JOB		Borehole: L-RT-16589		
Operator: <i>mk</i>		Checked: <i>mk</i>		Approved:	

	ASTM D2435-96		Test name Consolidation		
			Date of Test: 12-14-16		
	Site Reference: C.F. Harvey		Sample: ST-3		
	Jobfile: E:\16010.JOB		Borehole: L-RT-16589		
Operator: <i>mk</i>		Checked: <i>mk</i>		Approved:	

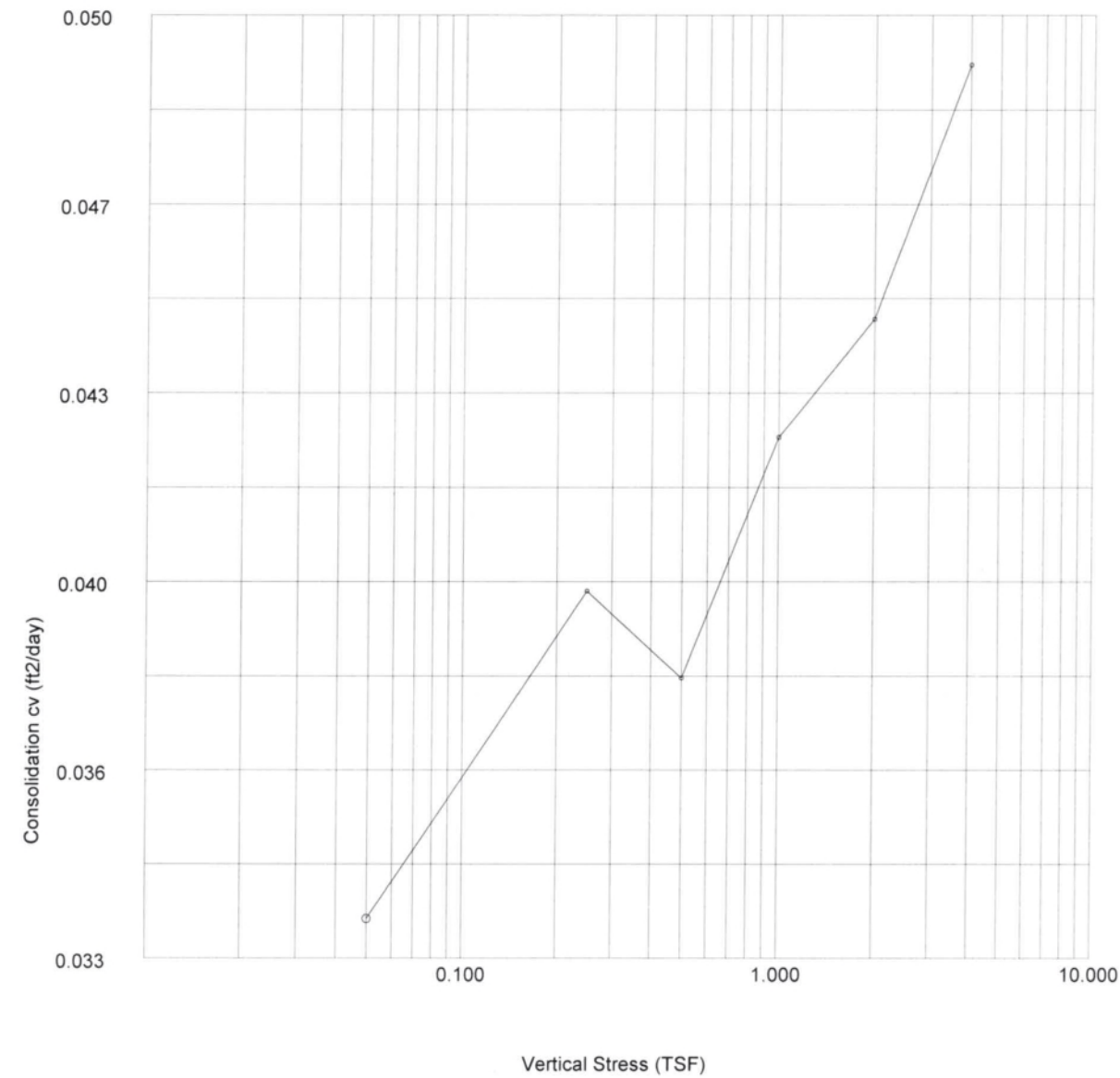


Oedometer Settlement Tests



ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	12-14-16
Jobfile: E:\16010.JOB		Sample:	ST-3
Operator: <i>mk</i>		Borehole:	L-RT-16589
Checked: <i>mk</i>		Approved:	

Oedometer Settlement Tests



ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	12-14-16
Jobfile: E:\16010.JOB		Sample:	ST-3
Operator: <i>mk</i>		Borehole:	L-RT-16589
Checked: <i>mk</i>		Approved:	

Oedometer Settlement Tests

Stress (TSF)	Initial Temp. oC	Settlement Total (in)	Cal Corr. (in)	Final Temp. oC	Voids Ratio e <sub>f</sub>	t <sub>50</sub> (mins)	Secondary Compr C <sub>sec</sub>	c <sub>v</sub> (ft2/day)	m <sub>v</sub> (ft2/ton)
0.050	21.6	0.0104	0.0	21.6	0.6306	14.559	0.0005	0.034	0.211
0.250	21.6	0.0252	0.0	21.6	0.6061	12.073	0.0074	0.040	0.076
0.500	21.6	0.0396	0.0	21.6	0.5823	12.195	0.0023	0.038	0.060
1.000	21.6	0.0608	0.0	21.6	0.5472	10.547	0.0107	0.042	0.045
2.000	21.6	0.0839	0.0	21.6	0.5090	9.578	0.0022	0.045	0.025
4.000	21.6	0.1104	0.0	21.6	0.4652	8.227	0.0027	0.049	0.015
2.000	21.6	0.1091	0.0	21.6	0.4673				0.001
0.500	21.6	0.1058	0.0	21.6	0.4728				0.002
0.050	21.6	0.1000	0.0	21.6	0.4824				0.014



ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	12-14-16
Jobfile: E:\16010.JOB		Sample:	ST-3
Operator: <i>mlk</i>		Borehole:	L-RT-16589
Checked: <i>mlk</i>		Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	0	0.0000	0.0000
2	0.017	4	0.0004	0.0004
3	0.033	4	0.0004	0.0004
4	0.050	5	0.0005	0.0005
5	0.067	5	0.0005	0.0005
6	0.083	5	0.0005	0.0005
7	0.100	5	0.0005	0.0005
8	0.200	6	0.0006	0.0006
9	0.400	7	0.0007	0.0007
10	0.800	9	0.0009	0.0009
11	1.000	10	0.0010	0.0010
12	2.000	15	0.0015	0.0015
13	4.000	22	0.0022	0.0022
14	8.000	32	0.0032	0.0032
15	10.000	39	0.0039	0.0039
16	20.000	56	0.0056	0.0056
17	40.000	80	0.0080	0.0080
18	80.000	92	0.0092	0.0092
19	100.000	96	0.0096	0.0096
20	200.000	101	0.0101	0.0101
21	400.000	104	0.0104	0.0104
22	800.000	104	0.0104	0.0104
23	1028.783	104	0.0104	0.0104

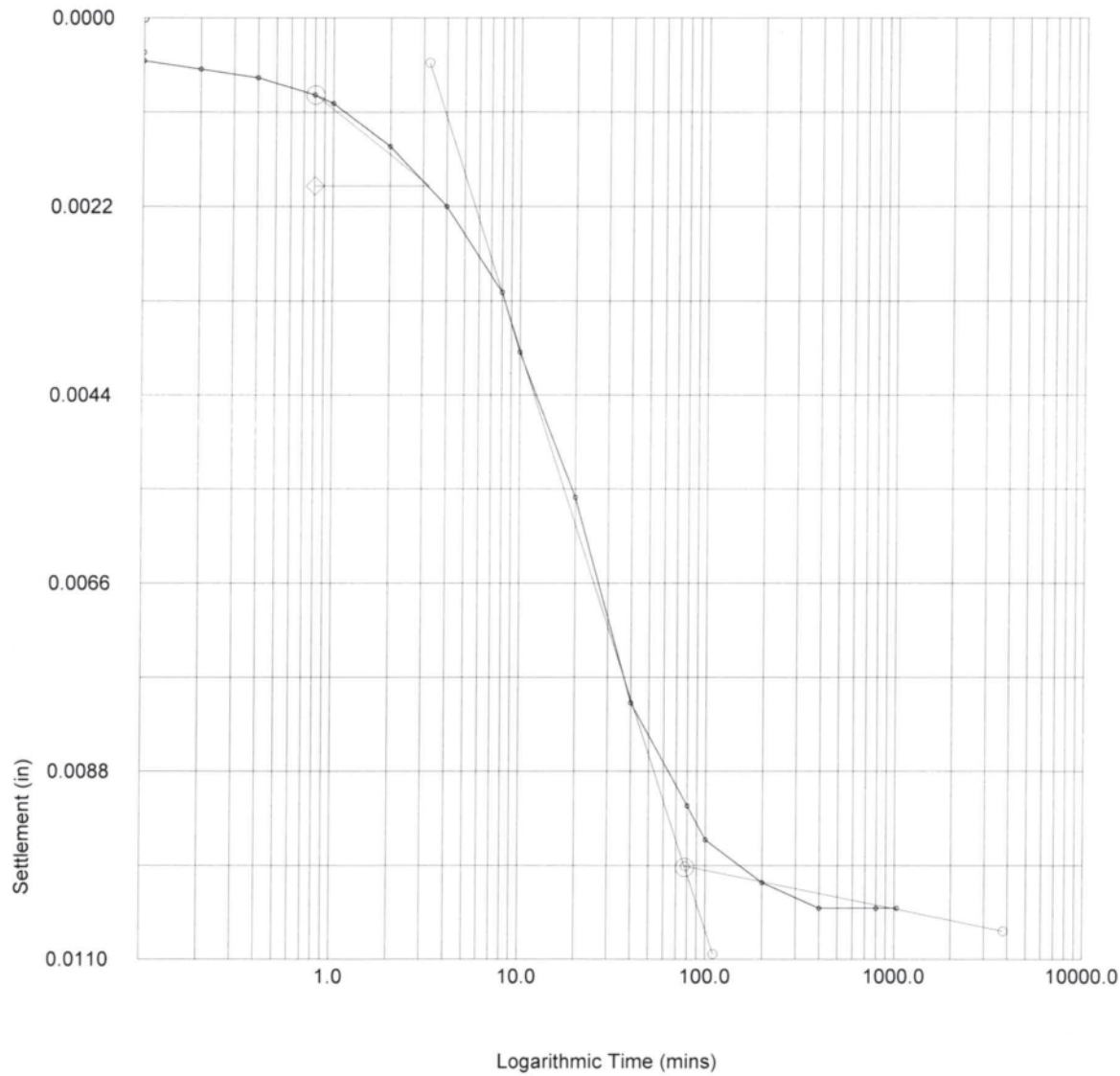


ASTM D2435-96		Test name	Consolidation Load: 0.050 (TSF)
Site Reference: C.F. Harvey		Date of Test:	12-14-16
Jobfile: E:\16010.JOB		Sample:	ST-3
Operator: <i>mlk</i>		Borehole:	L-RT-16589
Checked: <i>mlk</i>		Approved:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.050
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0104
Voids Ratio e	0.6306
Final Temp oC	0.0
t <sub>50</sub> (mins)	14.56
c <sub>v</sub> (ft <sup>2</sup> /day)	0.034
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.211
Sec Compression C <sub>sec</sub>	0.0005



Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	104	0.0104	0.0104
2	0.017	108	0.0108	0.0108
3	0.033	117	0.0117	0.0117
4	0.050	119	0.0119	0.0119
5	0.067	120	0.0120	0.0120
6	0.083	120	0.0120	0.0120
7	0.100	124	0.0124	0.0124
8	0.200	127	0.0127	0.0127
9	0.400	128	0.0128	0.0128
10	0.800	135	0.0135	0.0135
11	1.000	136	0.0136	0.0136
12	2.000	143	0.0143	0.0143
13	4.000	152	0.0152	0.0152
14	8.000	167	0.0167	0.0167
15	10.000	172	0.0172	0.0172
16	20.000	192	0.0192	0.0192
17	40.000	216	0.0216	0.0216
18	80.000	237	0.0237	0.0237
19	100.000	240	0.0240	0.0240
20	200.000	247	0.0247	0.0247
21	324.600	252	0.0252	0.0252



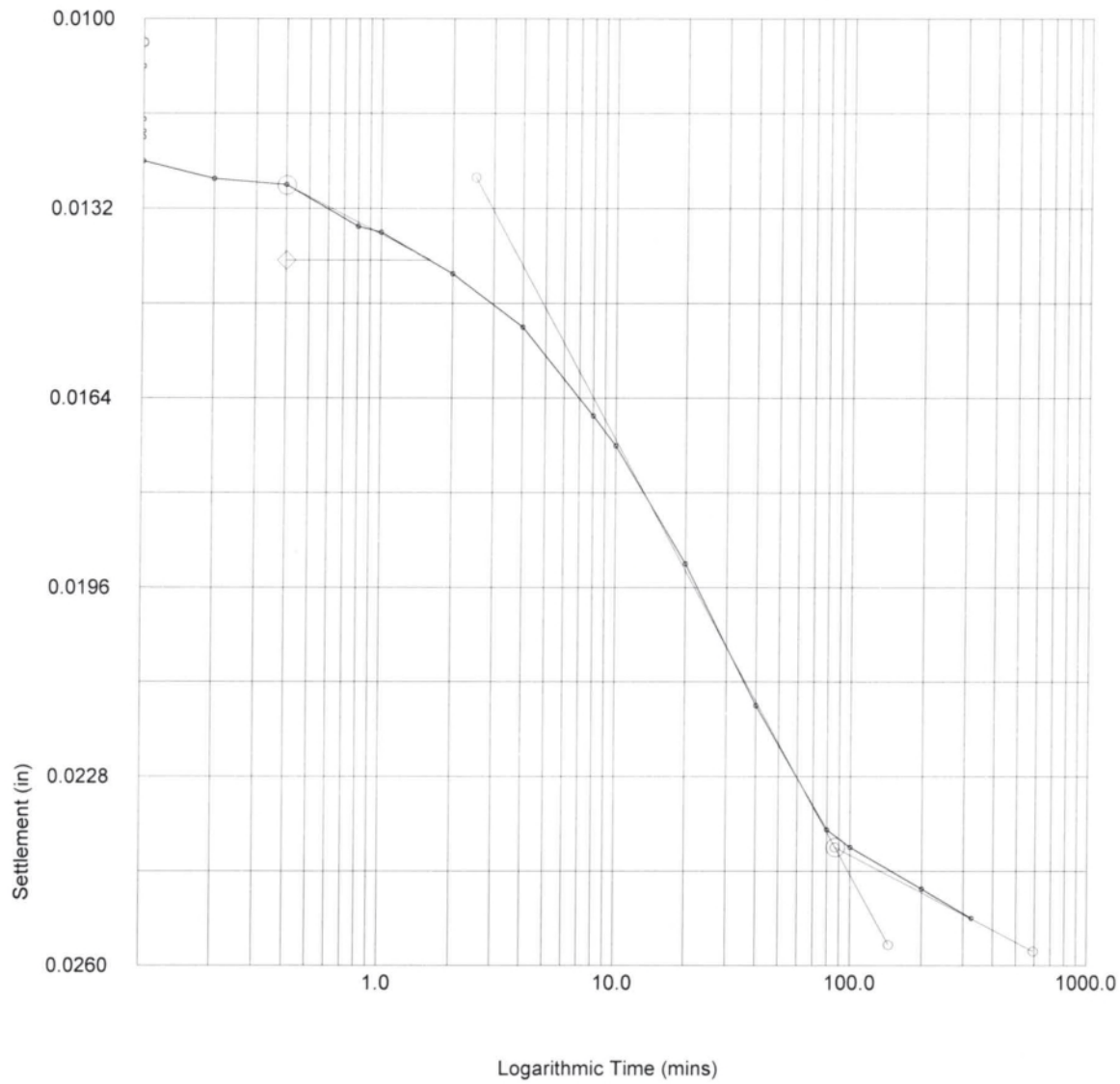
ASTM D2435-96	Test name	Consolidation	Load: 0.250 (TSF)
Site Reference: C.F. Harvey	Date of Test:	12-14-16	
Jobfile: E:\16010.JOB	Sample:	ST-3	
Operator: <i>mlk</i>	Borehole:	L-RT-16589	
Checked: <i>mlk</i>	Approved:		



Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.250
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0148
Voids Ratio e	0.6061
Final Temp oC	0.0
t <sub>50</sub> (mins)	12.07
c <sub>v</sub> (ft <sup>2</sup> /day)	0.04
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.076
Sec Compression C <sub>sec</sub>	0.0074



ASTM D2435-96	Test name Date of Test:	Consolidation 12-14-16
Site Reference: C.F. Harvey Jobfile: E:\16010.JOB	Sample: Borehole:	ST-3 L-RT-16589
Operator: <i>ml</i>	Checked: <i>ml</i>	Approved:

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	252	0.0252	0.0252
2	0.017	255	0.0255	0.0255
3	0.033	262	0.0262	0.0262
4	0.050	264	0.0264	0.0264
5	0.067	266	0.0266	0.0266
6	0.083	269	0.0269	0.0269
7	0.100	270	0.0270	0.0270
8	0.200	272	0.0272	0.0272
9	0.400	279	0.0279	0.0279
10	0.800	281	0.0281	0.0281
11	1.000	285	0.0285	0.0285
12	2.000	293	0.0293	0.0293
13	4.000	303	0.0303	0.0303
14	8.000	317	0.0317	0.0317
15	10.000	321	0.0321	0.0321
16	20.000	344	0.0344	0.0344
17	40.000	367	0.0367	0.0367
18	80.000	384	0.0384	0.0384
19	100.000	389	0.0389	0.0389
20	193.133	396	0.0396	0.0396



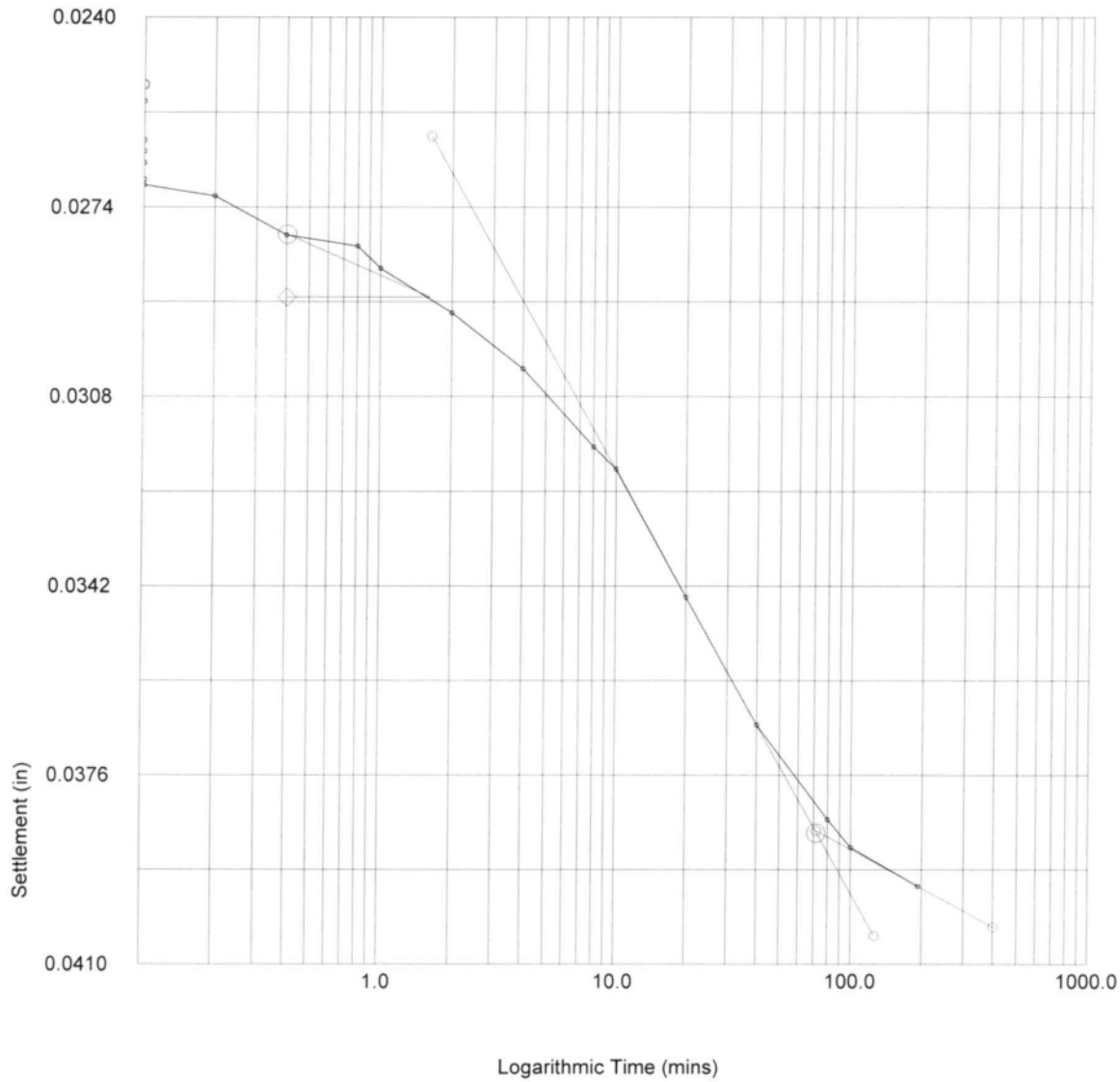
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Site Reference: C.F. Harvey Jobfile: E:\16010.JOB	Sample: Borehole:	ST-3 L-RT-16589
Operator: <i>ml</i>	Checked: <i>ml</i>	Approved:



Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.500
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0144
Voids Ratio e	0.5823
Final Temp oC	0.0
t <sub>50</sub> (mins)	12.20
c <sub>v</sub> (ft <sup>2</sup> /day)	0.038
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.06
Sec Compression C <sub>sec</sub>	0.0023



ASTM D2435-96	Test name	Consolidation
Site Reference: C.F. Harvey	Date of Test:	12-14-16
Jobfile: E:\16010.JOB	Sample:	ST-3
Operator: <i>mk</i>	Borehole:	L-RT-16589
Checked: <i>mk</i>	Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	397	0.0397	0.0397
2	0.017	398	0.0398	0.0398
3	0.033	398	0.0398	0.0398
4	0.050	400	0.0400	0.0400
5	0.067	416	0.0416	0.0416
6	0.083	424	0.0424	0.0424
7	0.100	429	0.0429	0.0429
8	0.200	432	0.0432	0.0432
9	0.400	440	0.0440	0.0440
10	0.800	448	0.0448	0.0448
11	1.000	449	0.0449	0.0449
12	2.000	462	0.0462	0.0462
13	4.000	478	0.0478	0.0478
14	8.000	497	0.0497	0.0497
15	10.000	508	0.0508	0.0508
16	20.000	540	0.0540	0.0540
17	40.000	572	0.0572	0.0572
18	80.000	591	0.0591	0.0591
19	100.000	593	0.0593	0.0593
20	200.000	600	0.0600	0.0600
21	400.000	605	0.0605	0.0605
22	800.000	607	0.0607	0.0607
23	917.267	608	0.0608	0.0608

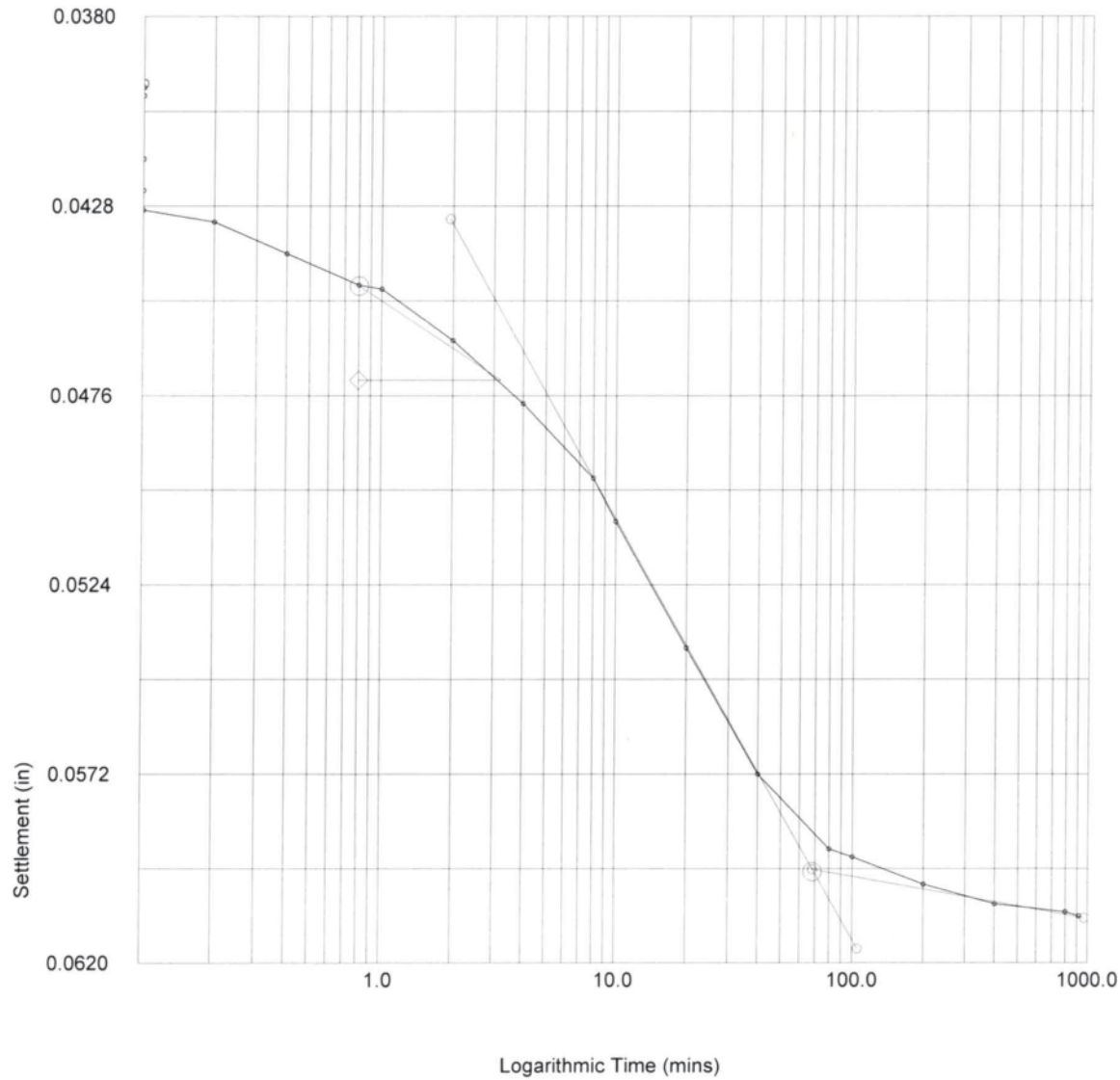


ASTM D2435-96	Test name	Consolidation	Load: 1.000 (TSF)
Site Reference: C.F. Harvey	Date of Test:	12-14-16	
Jobfile: E:\16010.JOB	Sample:	ST-3	
Operator: <i>mk</i>	Borehole:	L-RT-16589	
Checked: <i>mk</i>	Approved:		

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	1.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0211
Voids Ratio e	0.5472
Final Temp oC	0.0
t <sub>50</sub> (mins)	10.55
c <sub>v</sub> (ft <sup>2</sup> /day)	0.042
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.045
Sec Compression C <sub>sec</sub>	0.0107



ASTM D2435-96	Test name	Consolidation
Site Reference: C.F. Harvey	Date of Test:	12-14-16
Jobfile: E:\16010.JOB	Sample:	ST-3
Operator: <i>mlk</i>	Borehole:	L-RT-16589
Checked: <i>mlk</i>	Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	608	0.0608	0.0608
2	0.017	616	0.0616	0.0616
3	0.033	616	0.0616	0.0616
4	0.050	624	0.0624	0.0624
5	0.067	632	0.0632	0.0632
6	0.083	635	0.0635	0.0635
7	0.100	637	0.0637	0.0637
8	0.200	641	0.0641	0.0641
9	0.400	648	0.0648	0.0648
10	0.800	656	0.0656	0.0656
11	1.000	663	0.0663	0.0663
12	2.000	673	0.0673	0.0673
13	4.000	693	0.0693	0.0693
14	8.000	718	0.0718	0.0718
15	10.000	728	0.0728	0.0728
16	20.000	760	0.0760	0.0760
17	40.283	800	0.0800	0.0800
18	80.283	824	0.0824	0.0824
19	100.283	829	0.0829	0.0829
20	200.283	837	0.0837	0.0837
21	278.583	839	0.0839	0.0839

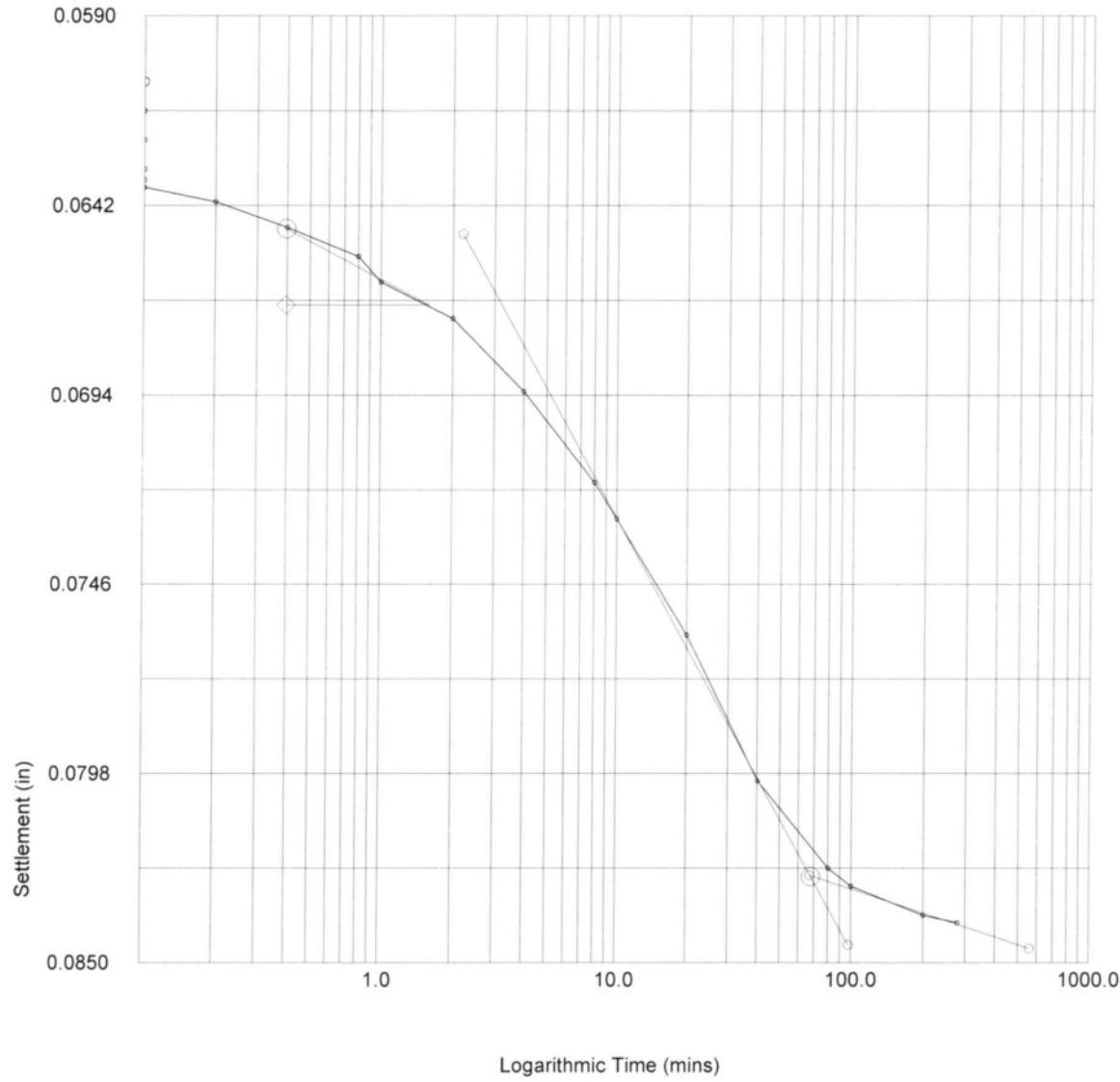


ASTM D2435-96	Test name	Consolidation	Load: 2.000 (TSF)
Site Reference: C.F. Harvey	Date of Test:	12-14-16	
Jobfile: E:\16010.JOB	Sample:	ST-3	
Operator: <i>mlk</i>	Borehole:	L-RT-16589	
Checked: <i>mlk</i>	Approved:		

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	2.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0231
Voids Ratio e	0.5090
Final Temp oC	0.0
t <sub>50</sub> (mins)	9.58
c <sub>v</sub> (ft <sup>2</sup> /day)	0.045
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.025
Sec Compression C <sub>sec</sub>	0.0022



ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	12-14-16
Jobfile: E:\16010.JOB		Sample:	ST-3
Operator: MK		Borehole:	L-RT-16589
Checked: MK		Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	839	0.0839	0.0839
2	0.017	840	0.0840	0.0840
3	0.033	843	0.0843	0.0843
4	0.050	864	0.0864	0.0864
5	0.067	865	0.0865	0.0865
6	0.083	871	0.0871	0.0871
7	0.100	872	0.0872	0.0872
8	0.200	880	0.0880	0.0880
9	0.400	888	0.0888	0.0888
10	0.800	901	0.0901	0.0901
11	1.000	904	0.0904	0.0904
12	2.000	920	0.0920	0.0920
13	4.000	944	0.0944	0.0944
14	8.000	976	0.0976	0.0976
15	10.000	988	0.0988	0.0988
16	20.000	1032	0.1032	0.1032
17	40.000	1072	0.1072	0.1072
18	80.000	1096	0.1096	0.1096
19	100.000	1100	0.1100	0.1100
20	171.167	1104	0.1104	0.1104



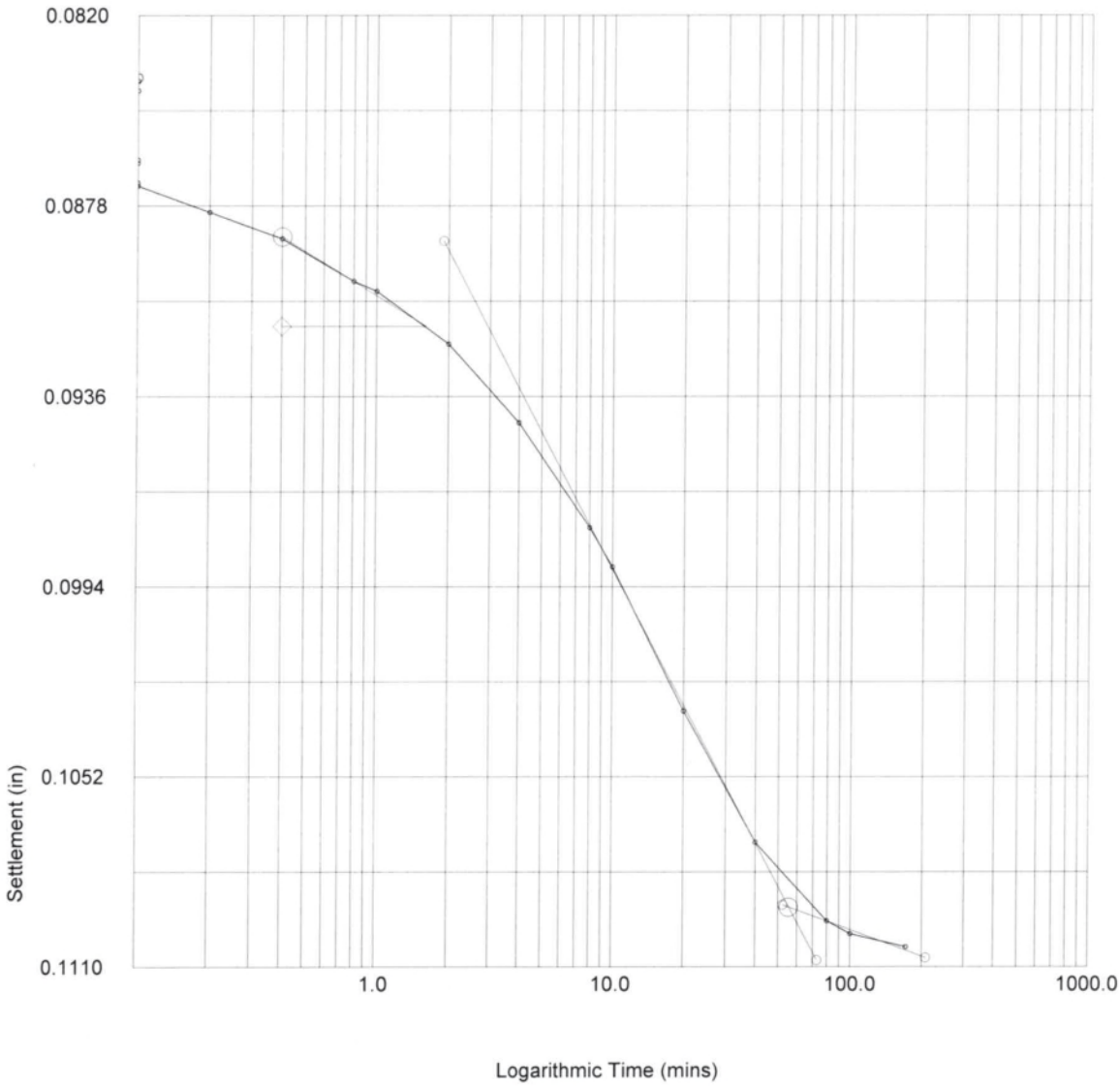
ASTM D2435-96		Test name	Consolidation Load: 4.000 (TSF)
Site Reference: C.F. Harvey		Date of Test:	12-14-16
Jobfile: E:\16010.JOB		Sample:	ST-3
Operator: MK		Borehole:	L-RT-16589
Checked: MK		Approved:	



Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	4.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0265
Voids Ratio e	0.4652
Final Temp oC	0.0
t <sub>50</sub> (mins)	8.23
c <sub>v</sub> (ft <sup>2</sup> /day)	0.049
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.015
Sec Compression C <sub>sec</sub>	0.0027



ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	12-14-16
Jobfile: E:\16010.JOB		Sample:	ST-3
Operator: <i>mk</i>		Borehole:	L-RT-16589
Checked: <i>mk</i>		Approved:	

Oedometer Settlement Tests

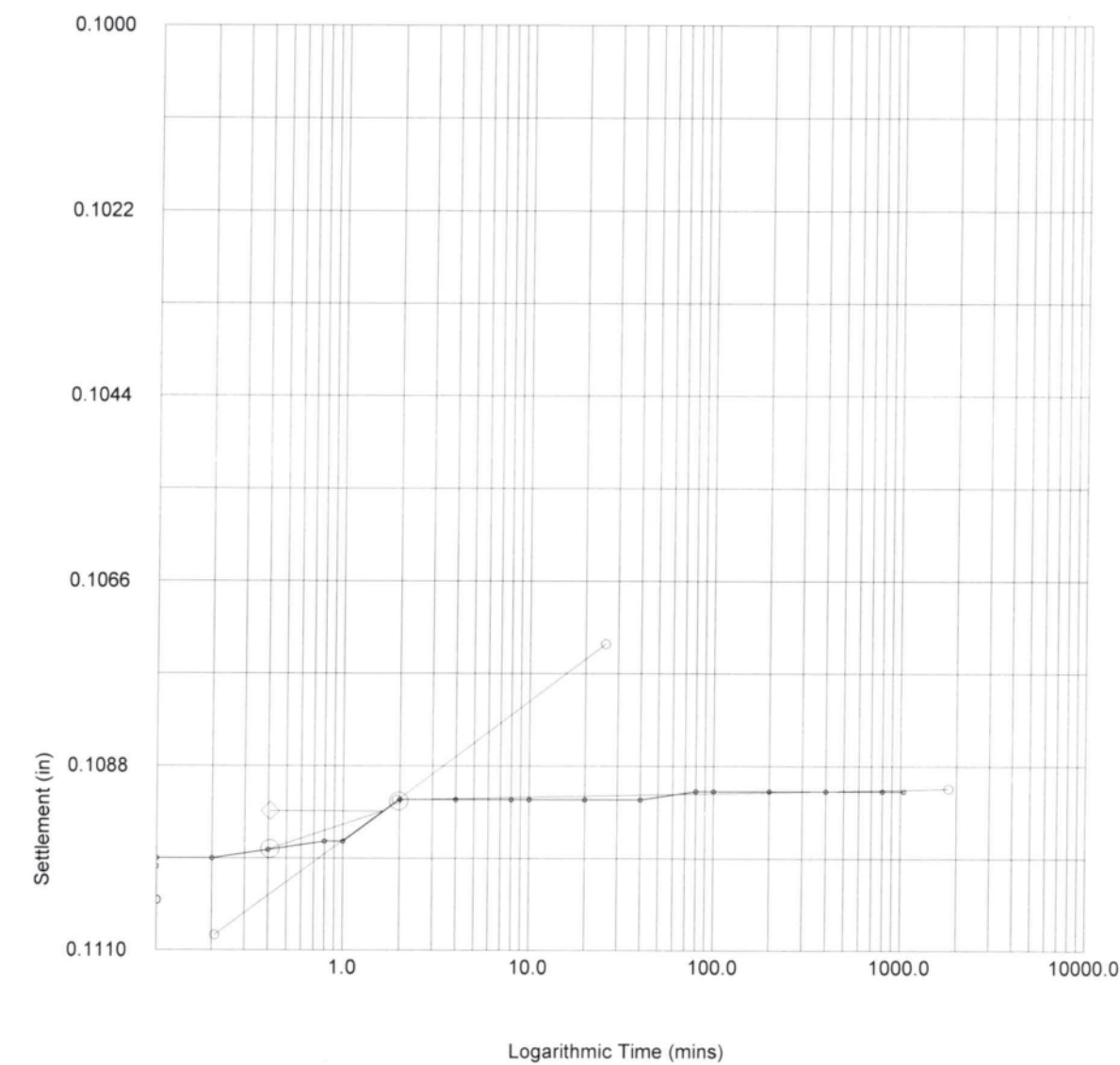
No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	1104	0.1104	0.1104
2	0.017	1100	0.1100	0.1100
3	0.033	1100	0.1100	0.1100
4	0.050	1100	0.1100	0.1100
5	0.067	1099	0.1099	0.1099
6	0.083	1099	0.1099	0.1099
7	0.100	1099	0.1099	0.1099
8	0.200	1099	0.1099	0.1099
9	0.400	1098	0.1098	0.1098
10	0.800	1097	0.1097	0.1097
11	1.000	1097	0.1097	0.1097
12	2.000	1092	0.1092	0.1092
13	4.000	1092	0.1092	0.1092
14	8.000	1092	0.1092	0.1092
15	10.000	1092	0.1092	0.1092
16	20.000	1092	0.1092	0.1092
17	40.000	1092	0.1092	0.1092
18	80.000	1091	0.1091	0.1091
19	100.000	1091	0.1091	0.1091
20	200.000	1091	0.1091	0.1091
21	400.000	1091	0.1091	0.1091
22	800.000	1091	0.1091	0.1091
23	1042.500	1091	0.1091	0.1091



ASTM D2435-96		Test name	Consolidation Load: 2.000 (TSF)
Site Reference: C.F. Harvey		Date of Test:	12-14-16
Jobfile: E:\16010.JOB		Sample:	ST-3
Operator: <i>mk</i>		Borehole:	L-RT-16589
Checked: <i>mk</i>		Approved:	

Oedometer Settlement Tests

Settlement Stage Results	
Vertical Stress (TSF)	2.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0013
Voids Ratio e	0.4673
Final Temp oC	
t <sub>50</sub> (mins)	
c <sub>v</sub> (ft <sup>2</sup> /day)	
m <sub>v</sub> (ft <sup>2</sup> /ton)	
Sec Compression C <sub>sec</sub>	



ASTM D2435-96	Test name	Consolidation
Site Reference: C.F. Harvey	Date of Test:	12-14-16
Jobfile: E:\16010.JOB	Sample:	ST-3
Operator: MK	Borehole:	L-RT-16589
Checked: MK	Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	1091	0.1091	0.1091
2	0.017	1084	0.1084	0.1084
3	0.033	1085	0.1085	0.1085
4	0.050	1084	0.1084	0.1084
5	0.067	1083	0.1083	0.1083
6	0.083	1083	0.1083	0.1083
7	0.100	1083	0.1083	0.1083
8	0.200	1082	0.1082	0.1082
9	0.400	1081	0.1081	0.1081
10	0.800	1076	0.1076	0.1076
11	1.000	1076	0.1076	0.1076
12	2.000	1075	0.1075	0.1075
13	4.000	1069	0.1069	0.1069
14	8.000	1067	0.1067	0.1067
15	10.000	1066	0.1066	0.1066
16	20.000	1062	0.1062	0.1062
17	40.000	1059	0.1059	0.1059
18	80.000	1058	0.1058	0.1058
19	100.000	1058	0.1058	0.1058
20	182.140	1058	0.1058	0.1058

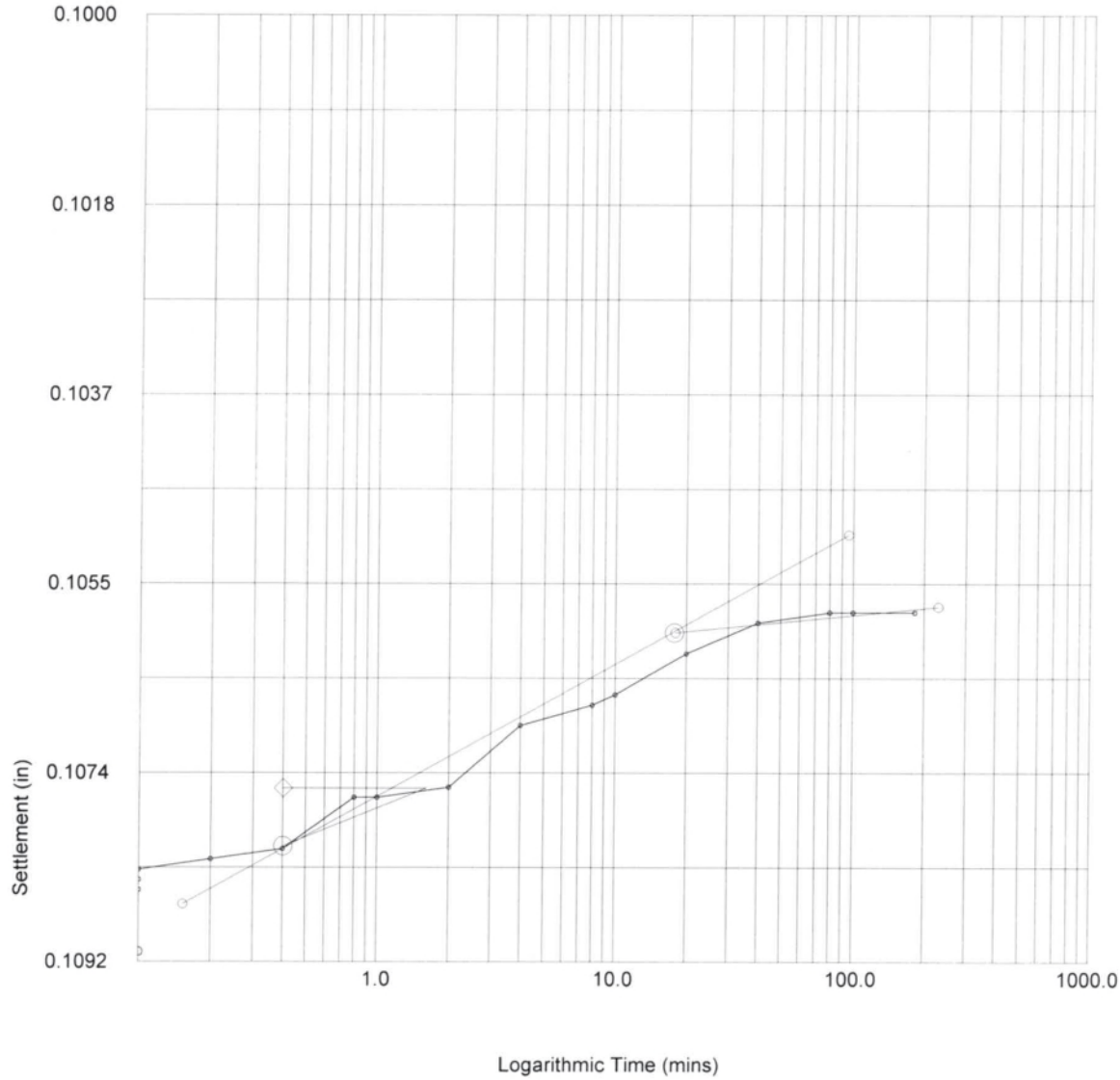


ASTM D2435-96	Test name	Consolidation	Load: 0.500 (TSF)
Site Reference: C.F. Harvey	Date of Test:	12-14-16	
Jobfile: E:\16010.JOB	Sample:	ST-3	
Operator: MK	Borehole:	L-RT-16589	
Checked: MK	Approved:		

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF) 0.500  
Initial Temp oC 21.6  
Correction (in) 0.0  
Settlement (in) 0.0033  
Voids Ratio e 0.4728  
  
Final Temp oC  
t<sub>50</sub> (mins)  
c<sub>v</sub> (ft<sup>2</sup>/day)  
m<sub>v</sub> (ft<sup>2</sup>/ton)  
Sec Compression C<sub>sec</sub>



Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	1058	0.1058	0.1058
2	0.017	1057	0.1057	0.1057
3	0.033	1052	0.1052	0.1052
4	0.050	1052	0.1052	0.1052
5	0.067	1052	0.1052	0.1052
6	0.083	1052	0.1052	0.1052
7	0.100	1052	0.1052	0.1052
8	0.200	1052	0.1052	0.1052
9	0.400	1051	0.1051	0.1051
10	0.800	1049	0.1049	0.1049
11	1.000	1049	0.1049	0.1049
12	2.000	1044	0.1044	0.1044
13	4.000	1042	0.1042	0.1042
14	8.000	1035	0.1035	0.1035
15	10.000	1033	0.1033	0.1033
16	20.000	1025	0.1025	0.1025
17	40.000	1016	0.1016	0.1016
18	80.000	1010	0.1010	0.1010
19	100.000	1008	0.1008	0.1008
20	200.000	1003	0.1003	0.1003
21	391.230	1000	0.1000	0.1000

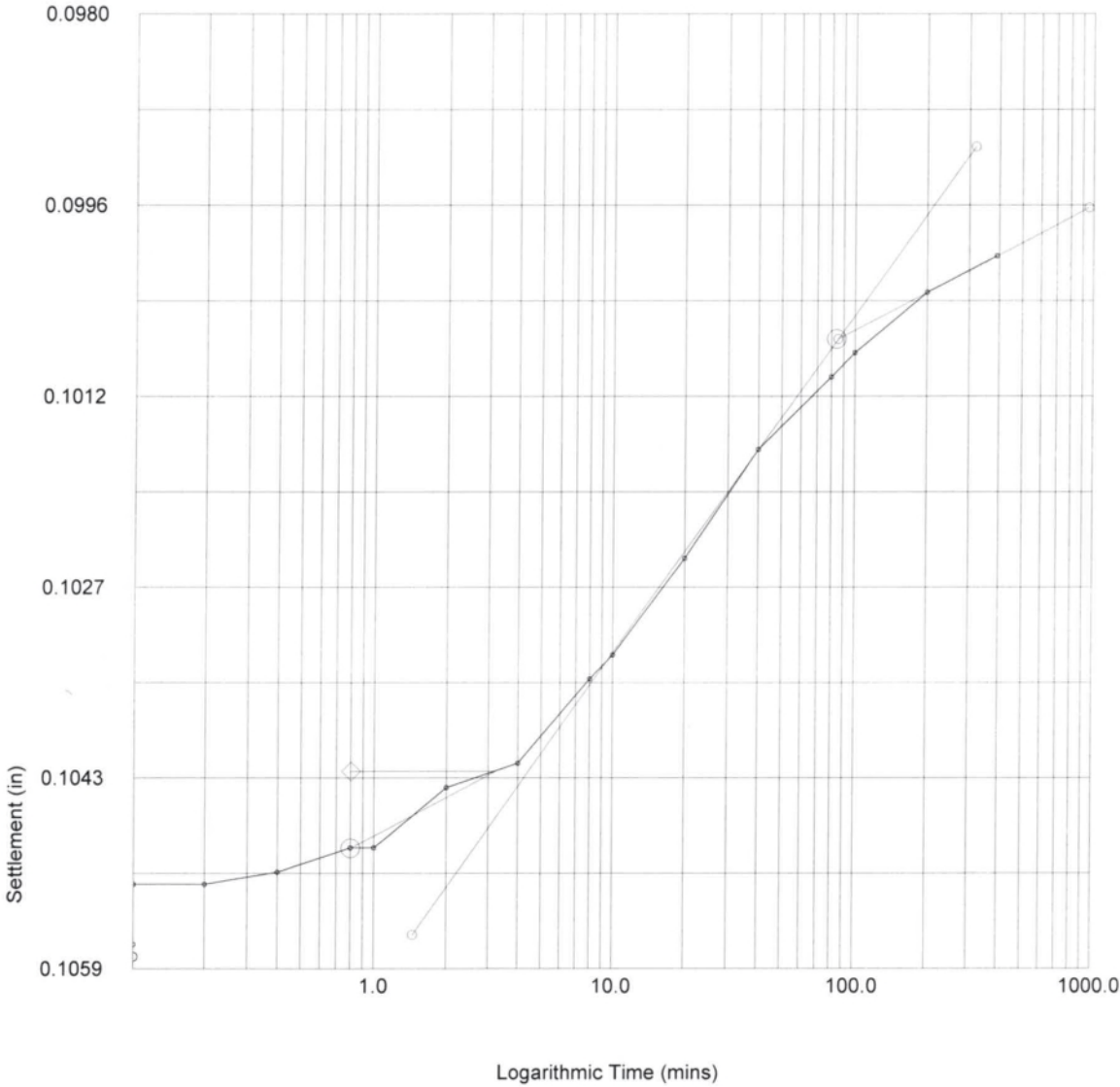
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	Site Reference: C.F. Harvey		Date of Test:	12-14-16
	Jobfile: E:\16010.JOB		Sample:	ST-3
	Operator: mk		Borehole:	L-RT-16589
Checked: mk		Approved:		



Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.050
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0058
Voids Ratio e	0.4824
Final Temp oC	
t <sub>50</sub> (mins)	
c <sub>v</sub> (ft <sup>2</sup> /day)	
m <sub>v</sub> (ft <sup>2</sup> /ton)	
Sec Compression C <sub>sec</sub>	



Effective Stress Triaxial Compression

Consolidated Undrained

Sample details

Sketch showing specimen location in original Sample



Depth	18.0 - 20.0 ft.		
Description:	Gray Coarse to Fine Sandy Silty CLAY (A-6) (2)		
Type	Specimen 1	Specimen 2	Specimen 3
Height H <sub>0</sub> (in)	Undisturbed	Undisturbed	Undisturbed
Diameter D <sub>0</sub> (in)	5.952	5.801	5.814
Weight W <sub>0</sub> (gr)	2.861	2.864	2.864
Bulk Density ρ (PCF)	1275	1236.8	1226.3
Particle Density ρ <sub>s</sub>	126.94	126.08	124.73
	2.663	2.663	2.663
	(measured)	(measured)	(measured)

Initial Conditions

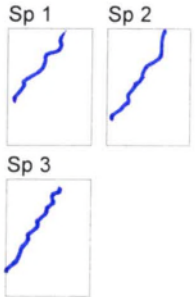
	Specimen 1	Specimen 2	Specimen 3
Cell Pressure σ <sub>3</sub> (lbf/in <sup>2</sup> )	8.0	15.0	22.0
Pore Pressure u (lbf/in <sup>2</sup> )	0.0	0.0	0.0
Machine Speed d <sub>r</sub> (in/min)	0.0081	0.0079	0.0104
No. of Membranes	1	1	1
Total Thickness (in)	0.012	0.012	0.012
Strain Channel	1798	1798	1798
Load Channel	1776	1776	1776
Pore P. Channel	1779	1779	1779
Volume Channel	Volume Chang	Volume Chang	Volume Chang
Moisture Content w <sub>0</sub> %	21.3	23.8	21.9
Dry Density ρ <sub>d0</sub> (PCF)	104.62	101.88	102.28
Voids Ratio e <sub>0</sub>	0.59	0.63	0.62
Deg of Saturation S <sub>0</sub> %	96.56	100.00	93.55
Final B Value	0.95	0.95	0.98

Final Conditions

	Specimen 1	Specimen 2	Specimen 3
Moisture Content w <sub>f</sub> %	19.7	20.1	18.7
Dry Density ρ <sub>d</sub> (PCF)	108.32	107.07	109.24
Voids Ratio e <sub>f</sub>	0.53	0.55	0.52
Deg of Saturation S <sub>f</sub> %	98.02	96.91	95.79
Failure Criteria	Mx Stress Ratio	Mx Stress Ratio	Mx Stress Ratio
Axial Strain ε <sub>f</sub> %	6.0	10.0	7.0
Corr Dev Stress (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub> (lbf/in <sup>2</sup> )	7.8	13.4	16.4
Minor Stress σ <sub>3f</sub> (lbf/in <sup>2</sup> )	3.7	6.8	8.3
Major Stress σ <sub>1f</sub> (lbf/in <sup>2</sup> )	11.5	20.2	24.7
Stress Ratio (σ <sub>1</sub> /σ <sub>3</sub> ) <sub>f</sub>	3.1	3.0	3.0

Notes:

Failure Sketch



Surface Inclination



ASTM D2435-96

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: mk

Test name: Consolidation  
Date of Test: 12-14-16

Sample: ST-3  
Borehole: L-RT-16589

Checked: mk

Approved:



Test Method: ASTM D4767-95

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: mk

Test name: CU Triaxial (SS, MS)  
Date of Test: 12-14-16

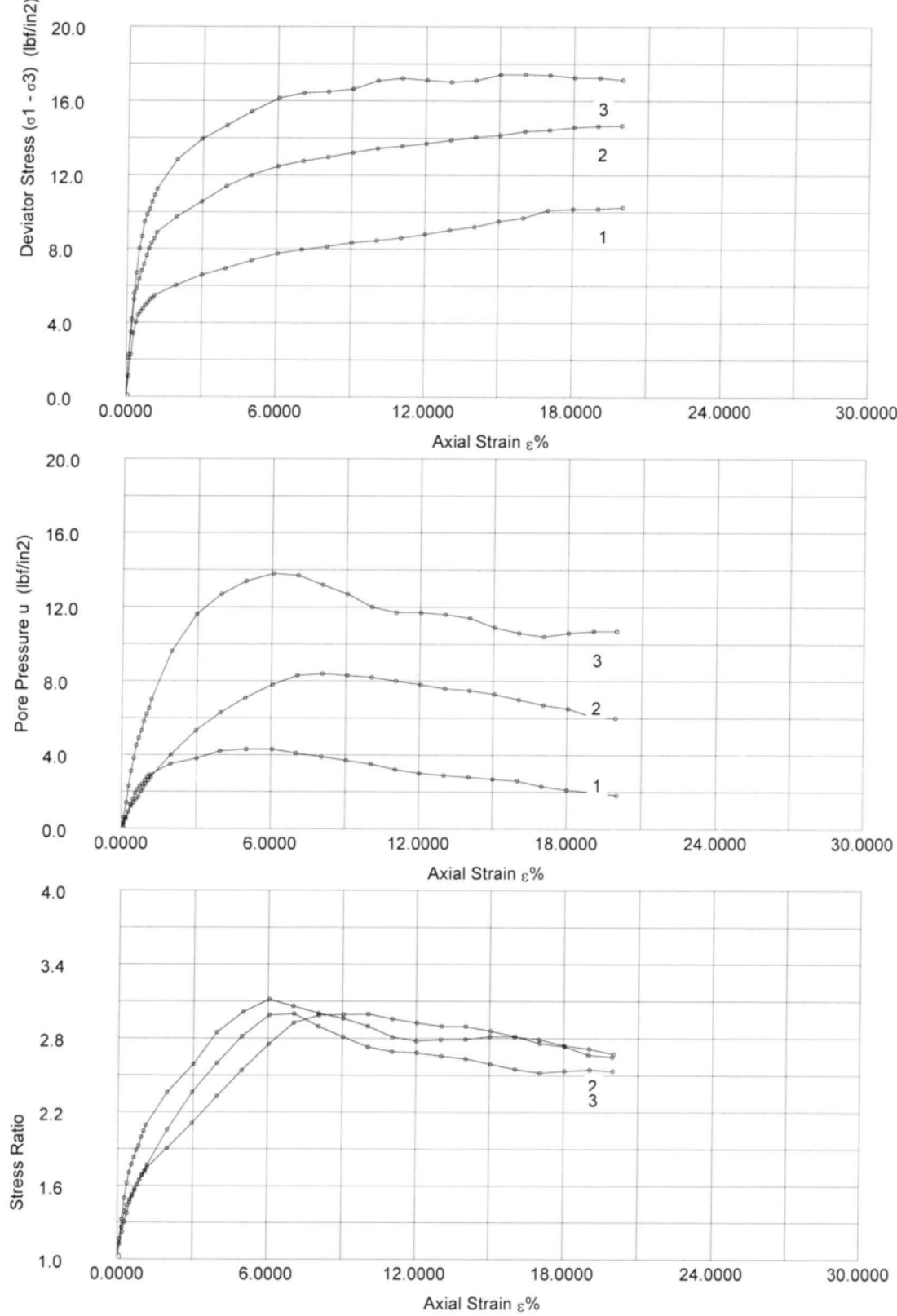
Sample: ST-3  
Borehole: L-RT-16589

Checked: mk

Approved:

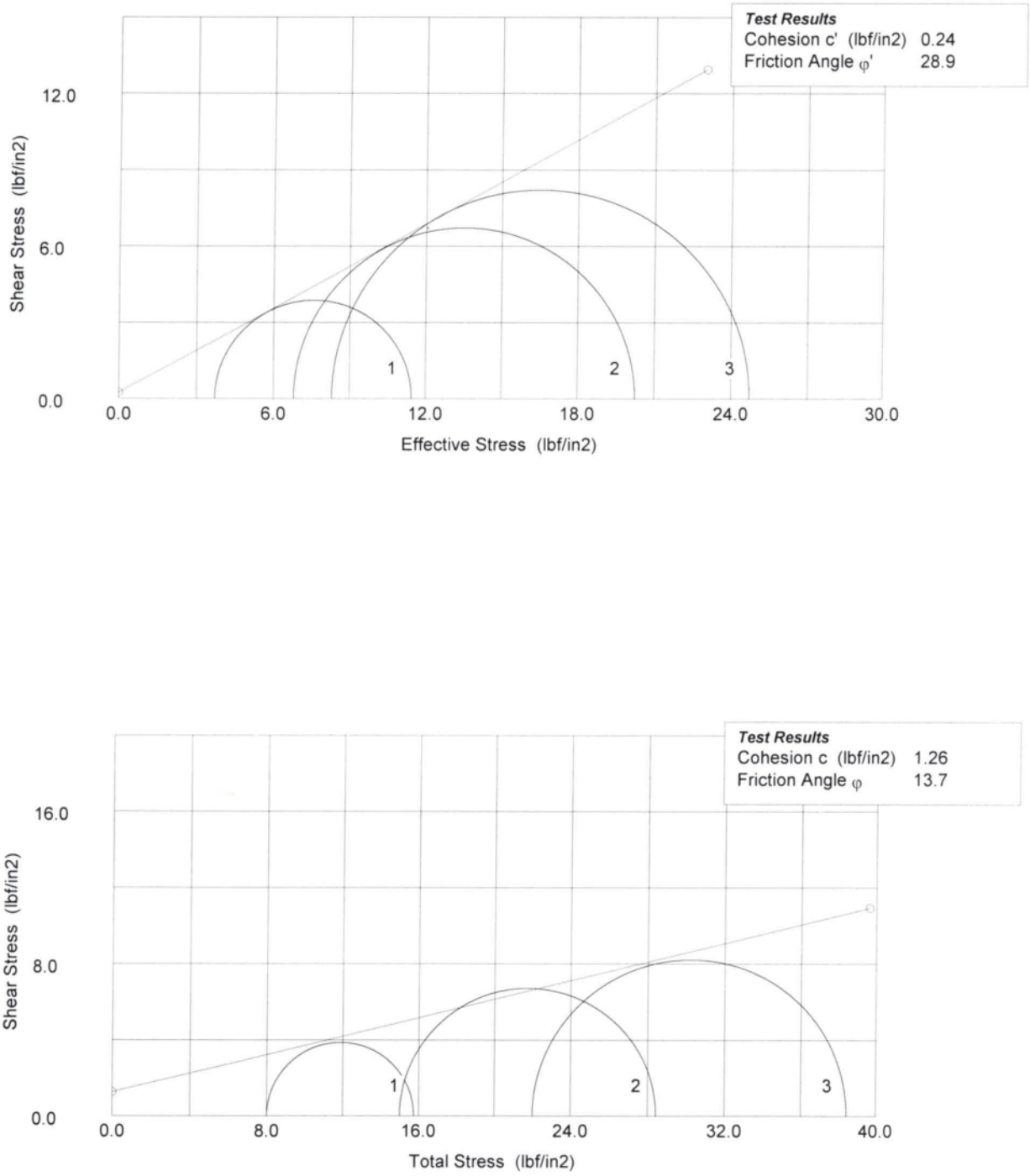
Effective Stress Triaxial Compression

Consolidated Undrained



Effective Stress Triaxial Compression

Consolidated Undrained



Test Method: ASTM D4767-95	Test name: CU Triaxial (SS, MS)
Site Reference: C.F. Harvey	Date of Test: 12-14-16
Jobfile: E:\16010.JOB	Sample: ST-3
Operator: MK	Borehole: L-RT-16589
Checked: MK	Approved:

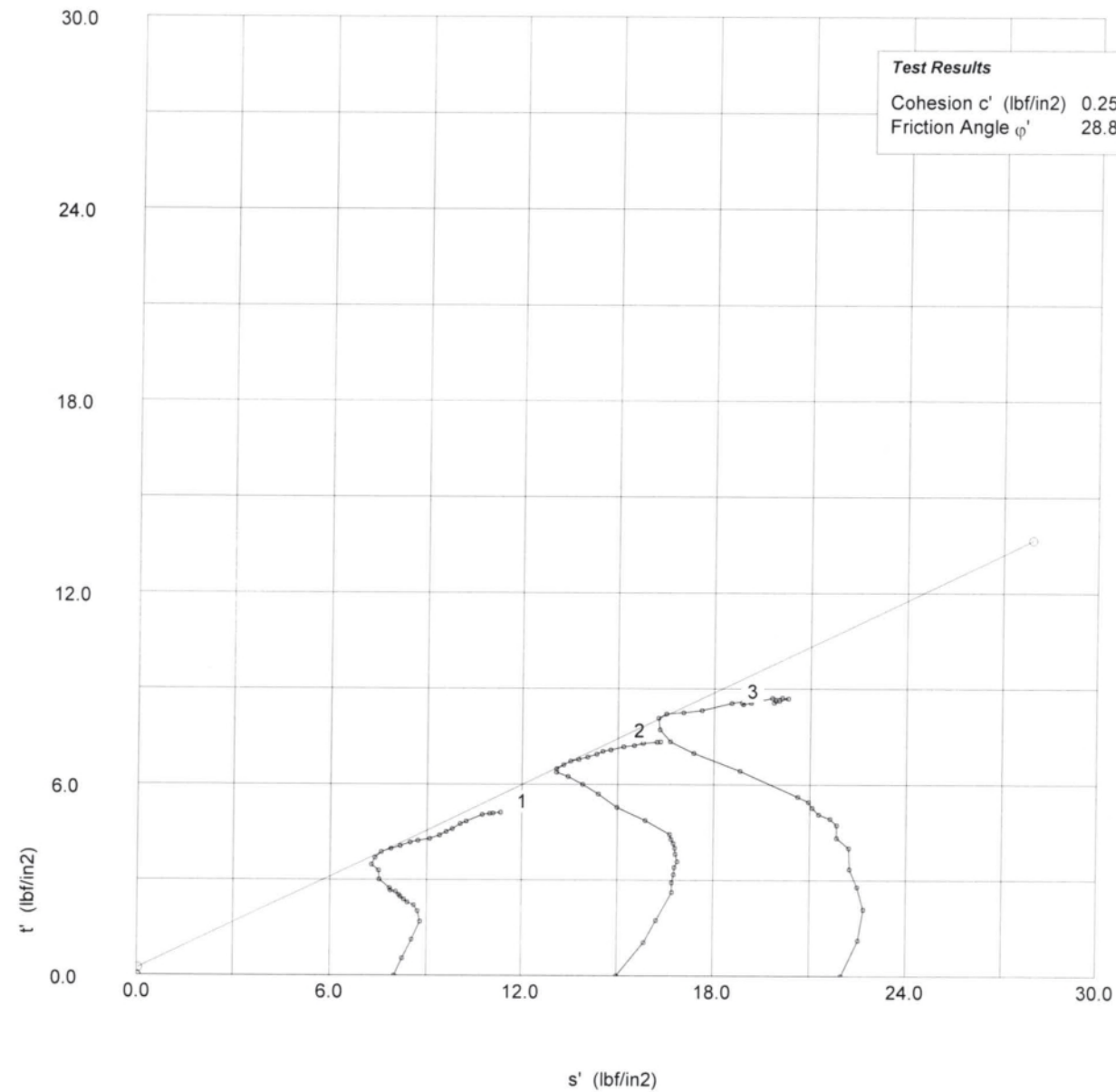


Test Method: ASTM D4767-95	Test name: CU Triaxial (SS, MS)
Site Reference: C.F. Harvey	Date of Test: 12-14-16
Jobfile: E:\16010.JOB	Sample: ST-3
Operator: MK	Borehole: L-RT-16589
Checked: MK	Approved:



# Effective Stress Triaxial Compression

## Consolidated Undrained



	Test Method: ASTM D4767-95		Test name: CU Triaxial (SS, MS)	
	Date of Test: 12-14-16			
	Site Reference: C.F. Harvey		Sample: ST-3	
	Jobfile: E:\16010.JOB		Borehole: L-RT-16589	
Operator: <i>mk</i>		Checked: <i>mk</i>		Approved:

# Effective Stress Triaxial Compression

## Consolidated Undrained Shear (Specimen 1)

No.	Strain (divs)	Strain $\epsilon\%$	Load (divs)	Load (lbs)	Pore Prs (divs)	Pore Prs (lbf/in <sup>2</sup> )	D. Stress $(\sigma_1 - \sigma_3)_m$ (lbf/in <sup>2</sup> )	D. Stress $(\sigma_1 - \sigma_3)_c$ (lbf/in <sup>2</sup> )	Minor Str $\sigma_3'$ (lbf/in <sup>2</sup> )	Major Str $\sigma_1'$ (lbf/in <sup>2</sup> )	Ratio $\sigma_1'/\sigma_3'$
1	24	0.00	589	0.0	0	0.0	0.0	0.0	8.00	8.00	1.00
2	73	0.08	658	6.9	3	0.3	1.1	1.1	7.70	8.80	1.14
3	128	0.18	732	14.3	6	0.6	2.3	2.3	7.40	9.67	1.31
4	183	0.27	803	21.4	9	0.9	3.4	3.4	7.10	10.50	1.48
5	240	0.37	844	25.5	13	1.3	4.0	4.0	6.70	10.74	1.60
6	294	0.46	867	27.8	16	1.6	4.4	4.4	6.40	10.80	1.69
7	346	0.55	889	30.0	19	1.9	4.7	4.6	6.10	10.69	1.75
8	405	0.65	901	31.2	21	2.1	4.9	4.8	5.90	10.67	1.81
9	458	0.74	913	32.4	23	2.3	5.1	5.0	5.70	10.66	1.87
10	513	0.83	920	33.1	24	2.4	5.2	5.1	5.60	10.66	1.90
11	572	0.93	933	34.4	26	2.6	5.4	5.3	5.40	10.66	1.97
12	625	1.02	938	34.9	28	2.8	5.5	5.3	5.20	10.54	2.03
13	680	1.11	947	35.8	29	2.9	5.6	5.5	5.10	10.57	2.07
14	1177	1.96	993	40.4	35	3.5	6.3	6.0	4.50	10.52	2.34
15	1793	3.01	1039	45.0	38	3.8	6.9	6.6	4.20	10.79	2.57
16	2348	3.95	1075	48.6	42	4.2	7.4	7.0	3.80	10.75	2.83
17	2966	5.00	1114	52.5	43	4.3	7.9	7.4	3.70	11.08	2.99
18	3582	6.05	1150	56.1	43	4.3	8.4	7.8	3.70	11.45	3.09
19	4150	7.01	1175	58.6	41	4.1	8.7	8.0	3.90	11.85	3.04
20	4752	8.03	1199	61.0	39	3.9	8.9	8.1	4.10	12.23	2.98
21	5340	9.03	1226	63.7	37	3.7	9.2	8.3	4.30	12.64	2.94
22	5930	10.04	1246	65.7	35	3.5	9.4	8.4	4.50	12.95	2.88
23	6518	11.03	1269	68.0	32	3.2	9.6	8.6	4.80	13.39	2.79
24	7096	12.02	1297	70.8	30	3.0	9.9	8.8	5.00	13.80	2.76
25	7684	13.02	1326	73.7	29	2.9	10.2	9.0	5.10	14.12	2.77
26	8273	14.02	1354	76.5	28	2.8	10.5	9.2	5.20	14.41	2.77
27	8857	15.01	1389	80.0	27	2.7	10.8	9.5	5.30	14.81	2.79
28	9437	16.00	1416	82.7	26	2.6	11.1	9.7	5.40	15.08	2.79
29	10026	17.00	1463	87.4	23	2.3	11.5	10.1	5.70	15.79	2.77
30	10622	18.01	1484	89.5	21	2.1	11.7	10.2	5.90	16.06	2.72
31	11218	19.02	1499	91.0	20	2.0	11.7	10.2	6.00	16.17	2.70
32	11807	20.02	1519	93.0	18	1.8	11.8	10.2	6.20	16.44	2.65

	Test Method: ASTM D4767-95		Test name: CU Triaxial (SS, MS) Shear (Specimen 1)	
	Date of Test: 12-14-16			
	Site Reference: C.F. Harvey		Sample: ST-3	
	Jobfile: E:\16010.JOB		Borehole: L-RT-16589	
Operator: <i>mk</i>		Checked: <i>mk</i>		Approved:

Effective Stress Triaxial Compression

Page 2 / 3

Consolidated Undrained Shear (Specimen 2)

No.	Strain (divs)	Strain ε%	Load (divs)	Load (lbs)	Pore Prs (divs)	Pore Prs (lb/in2)	D. Stress (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>m</sub> (lb/in2)	D. Stress (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>c</sub> (lb/in2)	Minor Str σ <sub>3</sub> ' (lb/in2)	Major Str σ <sub>1</sub> ' (lb/in2)	Ratio σ <sub>1</sub> '/σ <sub>3</sub> '
1	70	0.00	666	0.0	0	0.0	0.0	0.0	15.00	15.00	1.00
2	118	0.08	797	13.1	2	0.2	2.1	2.1	14.80	16.90	1.14
3	175	0.18	883	21.7	5	0.5	3.5	3.5	14.50	17.98	1.24
4	230	0.28	994	32.8	9	0.9	5.2	5.2	14.10	19.35	1.37
5	286	0.38	1031	36.5	12	1.2	5.8	5.8	13.80	19.64	1.42
6	345	0.48	1064	39.8	14	1.4	6.4	6.4	13.60	19.96	1.47
7	399	0.58	1102	43.6	16	1.6	7.0	6.8	13.40	20.20	1.51
8	454	0.67	1126	46.0	17	1.7	7.3	7.2	13.30	20.47	1.54
9	514	0.78	1156	49.0	20	2.0	7.8	7.6	13.00	20.64	1.59
10	567	0.87	1180	51.4	22	2.2	8.2	8.0	12.80	20.82	1.63
11	622	0.97	1199	53.3	24	2.4	8.5	8.3	12.60	20.91	1.66
12	684	1.08	1216	55.0	26	2.6	8.7	8.6	12.40	20.97	1.69
13	739	1.17	1236	57.0	28	2.8	9.0	8.9	12.20	21.08	1.73
14	1191	1.96	1303	63.7	40	4.0	10.0	9.7	11.00	20.74	1.89
15	1757	2.96	1367	70.1	53	5.3	10.9	10.6	9.70	20.26	2.09
16	2325	3.95	1436	77.0	63	6.3	11.9	11.4	8.70	20.09	2.31
17	2894	4.95	1489	82.3	71	7.1	12.6	12.0	7.90	19.90	2.52
18	3518	6.04	1536	87.0	78	7.8	13.1	12.5	7.20	19.68	2.73
19	4091	7.05	1569	90.3	83	8.3	13.5	12.8	6.70	19.46	2.90
20	4659	8.04	1599	93.3	84	8.4	13.8	13.0	6.60	19.57	2.97
21	5227	9.04	1631	96.5	83	8.3	14.1	13.2	6.70	19.91	2.97
22	5800	10.04	1663	99.7	82	8.2	14.4	13.4	6.80	20.24	2.98
23	6367	11.04	1688	102.2	80	8.0	14.6	13.6	7.00	20.56	2.94
24	6937	12.04	1716	105.0	78	7.8	14.8	13.7	7.20	20.91	2.90
25	7510	13.04	1745	107.9	76	7.6	15.1	13.9	7.40	21.28	2.88
26	8079	14.04	1776	111.0	75	7.5	15.3	14.1	7.50	21.56	2.87
27	8647	15.03	1800	113.4	73	7.3	15.5	14.2	7.70	21.85	2.84
28	9222	16.04	1834	116.8	70	7.0	15.7	14.4	8.00	22.36	2.80
29	9791	17.04	1859	119.3	67	6.7	15.9	14.4	8.30	22.74	2.74
30	10362	18.04	1889	122.3	65	6.5	16.1	14.6	8.50	23.08	2.71
31	10906	18.99	1912	124.6	61	6.1	16.2	14.6	8.90	23.55	2.65
32	11456	19.96	1932	126.6	60	6.0	16.3	14.7	9.00	23.67	2.63



Test Method: ASTM D4767-95		Test name CU Triaxial (SS, MS) Shear (Specimen 2)	
Site Reference: C.F. Harvey		Date of Test: 12-14-16	
Jobfile: E:\16010.JOB		Sample: ST-3	
Operator: <i>MLC</i>		Borehole: L-RT-16589	
Checked: <i>MLC</i>		Approved:	

Effective Stress Triaxial Compression

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Consolidated Undrained Shear (Specimen 3)

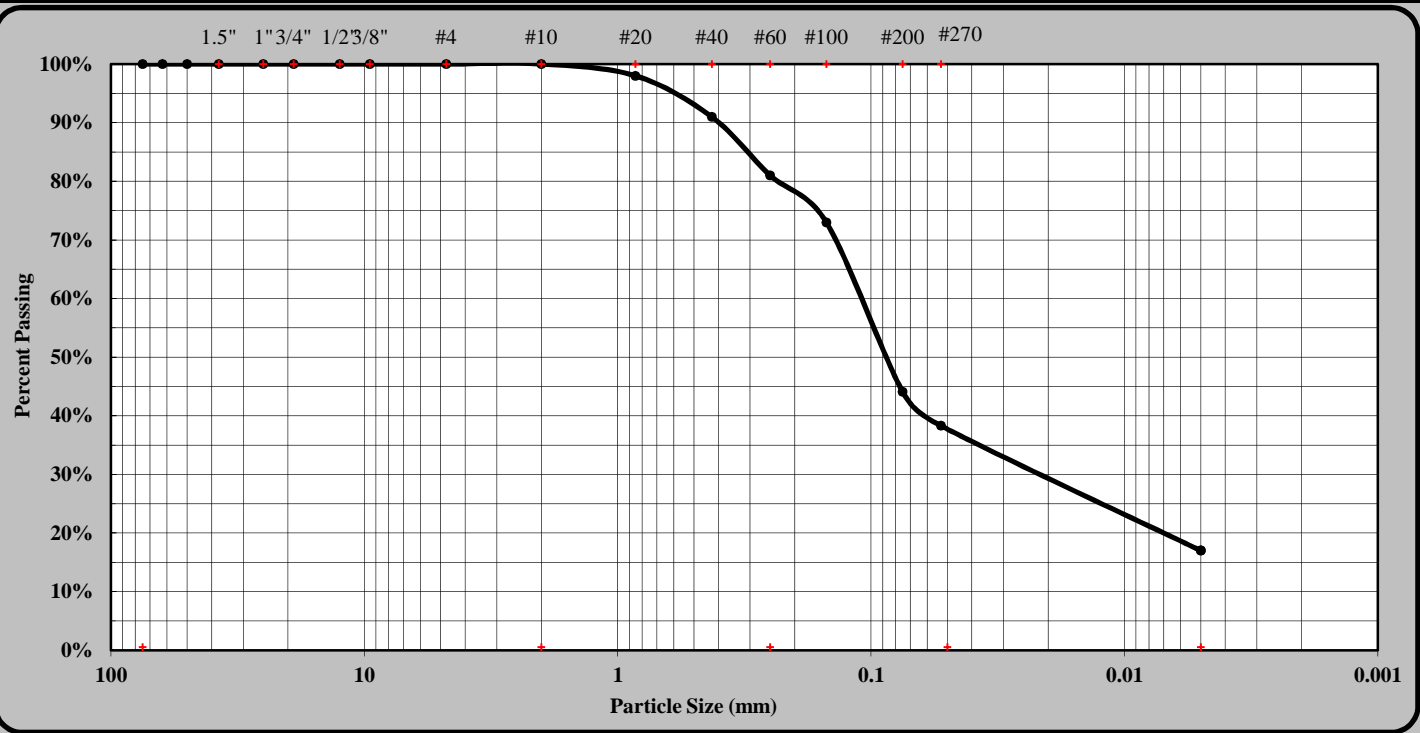
No.	Strain (divs)	Strain ε%	Load (divs)	Load (lbs)	Pore Prs (divs)	Pore Prs (lb/in2)	D. Stress (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>m</sub> (lb/in2)	D. Stress (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>c</sub> (lb/in2)	Minor Str σ <sub>3</sub> ' (lb/in2)	Major Str σ <sub>1</sub> ' (lb/in2)	Ratio σ <sub>1</sub> '/σ <sub>3</sub> '
1	72	0.00	689	0.0	0	0.0	0.0	0.0	22.00	22.00	1.00
2	126	0.09	828	13.9	6	0.6	2.3	2.3	21.40	23.65	1.11
3	184	0.20	947	25.8	14	1.4	4.2	4.2	20.60	24.78	1.20
4	237	0.29	1034	34.5	23	2.3	5.6	5.6	19.70	25.28	1.28
5	290	0.38	1103	41.4	31	3.1	6.7	6.7	18.90	25.59	1.35
6	350	0.49	1186	49.7	38	3.8	8.0	8.0	18.20	26.22	1.44
7	403	0.58	1236	54.7	45	4.5	8.8	8.7	17.50	26.16	1.50
8	458	0.68	1286	59.7	49	4.9	9.6	9.5	17.10	26.56	1.55
9	518	0.78	1311	62.2	53	5.3	10.0	9.9	16.70	26.55	1.59
10	571	0.88	1329	64.0	58	5.8	10.3	10.1	16.20	26.33	1.63
11	625	0.97	1355	66.6	62	6.2	10.7	10.5	15.80	26.34	1.67
12	685	1.08	1379	69.0	65	6.5	11.1	10.9	15.50	26.41	1.70
13	739	1.17	1400	71.1	70	7.0	11.4	11.2	15.00	26.24	1.75
14	1193	1.97	1514	82.5	96	9.6	13.1	12.8	12.40	25.24	2.04
15	1756	2.96	1598	90.9	116	11.6	14.3	14.0	10.40	24.35	2.34
16	2320	3.95	1662	97.3	127	12.7	15.2	14.7	9.30	23.98	2.58
17	2889	4.95	1726	103.7	134	13.4	16.0	15.4	8.60	24.03	2.79
18	3510	6.04	1790	110.1	138	13.8	16.8	16.1	8.20	24.34	2.97
19	4080	7.05	1826	113.7	137	13.7	17.1	16.4	8.30	24.73	2.98
20	4645	8.04	1848	115.9	132	13.2	17.3	16.5	8.80	25.29	2.87
21	5210	9.03	1876	118.7	127	12.7	17.5	16.6	9.30	25.94	2.79
22	5782	10.04	1926	123.7	120	12.0	18.1	17.1	10.00	27.10	2.71
23	6349	11.03	1954	126.5	117	11.7	18.3	17.2	10.30	27.52	2.67
24	6916	12.03	1967	127.8	117	11.7	18.2	17.1	10.30	27.42	2.66
25	7487	13.03	1979	129.0	116	11.6	18.2	17.0	10.40	27.42	2.64
26	8055	14.03	2006	131.7	114	11.4	18.4	17.1	10.60	27.71	2.61
27	8623	15.03	2048	135.9	109	10.9	18.7	17.4	11.10	28.52	2.57
28	9194	16.04	2070	138.1	106	10.6	18.8	17.4	11.40	28.83	2.53
29	9762	17.03	2089	140.0	104	10.4	18.8	17.4	11.60	28.99	2.50
30	10331	18.03	2101	141.2	106	10.6	18.8	17.3	11.40	28.66	2.51
31	10905	19.04	2120	143.1	107	10.7	18.8	17.2	11.30	28.54	2.53
32	11433	19.97	2131	144.2	107	10.7	18.7	17.1	11.30	28.43	2.52



Test Method: ASTM D4767-95		Test name CU Triaxial (SS, MS) Shear (Specimen 3)	
Site Reference: C.F. Harvey		Date of Test: 12-14-16	
Jobfile: E:\16010.JOB		Sample: ST-3	
Operator: <i>MLC</i>		Borehole: L-RT-16589	
Checked: <i>MLC</i>		Approved:	



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/14/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/14/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-RT-16705	Sample #:	SS-21
Location:	167+05	Sample Date:	9/6/16
		Offset:	36' RT
		Depth (ft):	0.5 - 2.0
Sample Description:	Light Gray Coarse to Fine Sandy Clayey SILT A-4 (0)		



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#10	Coarse Sand	19%	Silt	21%
Gravel	0%	Fine Sand	43%	Clay	17%
Apparent Relative Density	ND	Moisture Content	17.6%	% Passing #200	44.1%
Liquid Limit	19	Plastic Limit	12	Plastic Index	7
Soil Mortar (-#10 Sieve)					
Coarse Sand	19%	Fine Sand	43%	Silt	21%
				Clay	17%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>		Angular	<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.


Mal Krajan, ET  
Technician Name

104-01-0703  
Certification No.

Laboratory Manager

11/14/2016  
Date

Mal Krajan, ET  
Technical Responsibility

  
Signature

Laboratory Manager

11/14/2016  
Date

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S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616			
Project #:	6235-16-010	Report Date:	10/21/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/18 - 10/21/16
Client Name:	Michael Baker Engineering		
Client Address:	Raleigh, NC		
Boring #:	L-RT-16705	Sample #:	SS-21
Location:	167+05	Sample Date:	9/6/16
		Offset:	36' RT
		Depth (ft):	0.5 - 2.0
Sample Description:	Light Gray Coarse to Fine Sandy Clayey SILT (A-4) (0)		

Equipment: Balance: 0.01 g.Readability, 500g. Minimum Capaccity

Balance: S&ME ID #: 1024 Cal. Date: 11/06/16 Due: 11/06/17

Method A: Moisture Content Determination Required Oven Temperature:105 ± 5° C

Oven Temperature: 105 °C		Tare #	v
t	Tare Weight (Dish plus Aluminum Foil Cover)	grams	47.97
a	Mass of As-Received Specimen + Tare Wt.	grams	99.48
b	Mass of Oven Dry Specimen + Tare Wt.	grams	91.78
w	Water Weight	(a-b)	7.70
A	Mass of As-Received Specimen	(a-t)	51.51
B	Mass of Oven Dry Specimen	(b-t)	43.81
% Moisture Content as a % of As Received or Total Mass		(w/A)*100	14.9%
% Moisture Content as a % of Oven-dried Mass		(w/B)*100	17.6%


Oven S&ME ID #: 1454 Cal. Date: 10/7/16 Due: 10/7/17

Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination		Muffle Furnace: 455 °C		Tare #	30
t	Tare Weight (Dish plus Aluminum Foil Cover)	grams		49.02	
b	Mass of Oven Dry Specimen + Tare Wt.	grams		87.18	
c	Ash Weight + Tare Wt.	grams		86.87	
C	Ash Weight	c-t		37.85	
B	Mass of Oven Dry Specimen	(b-t)		38.16	
D	% Ash Content	(C/B)*100		99.2%	
	% Organic Matter	100-D		0.8%	

Muffle Furnace: S&ME ID #: 00261

Notes / Deviations / References:

Mal Krajan, ET  
Technical Responsibility

  
Signature

Laboratory Manager

11/14/2016  
Date

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pH of Soil

AASHTO T289

Quality Assurance



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616							
Project #:	6235-16-010	Report Date:	11/7/16				
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/5 - 11/7/16				
Client Name:	Michael Baker Engineering						
Client Address:	Raleigh, NC						
Boring #:	L-RT-16705	Sample #:	SS-21	Sample Date:	9/6/16		
Location:	167+05	Offset:	36' RT	Depth (ft):	0.5 - 2.0		
Sample Description: Light Gray Coarse to Fine Sandy Clayey SILT (A-4) (0)							
Equipment:							
Balance	S&ME ID#	1024	Cal. Date:	11/6/16	Due:	11/6/17	
Sieve:	#10	S&ME ID#	13223	Cal. Date:	6/11/16	Due:	6/11/17
pH Meter:		S&ME ID#	1365	Cal. Date:	11/7/16	Due:	NA

pH Meter Calibration

Buffer Solution	Results
pH buffer 7.0	7.02
pH buffer 4.01	4.01
pH buffer 10.0	10.03
Buffer Temperature °C	22.4

Measuring pH of Soil

Measurements	
Weightt of Air Dry Soil (g)	30.02
Distilled Water (g)	30.04
Temperature °C	21.7
pH Readings	5.43

Notes / Deviations / References: AASHTO T-289: Determining pH of Soil for Use in Corrosion Testing

Mal Krajan, ET		Laboratory Manager	11/14/2016
Technical Responsibility	Signature	Position	Date
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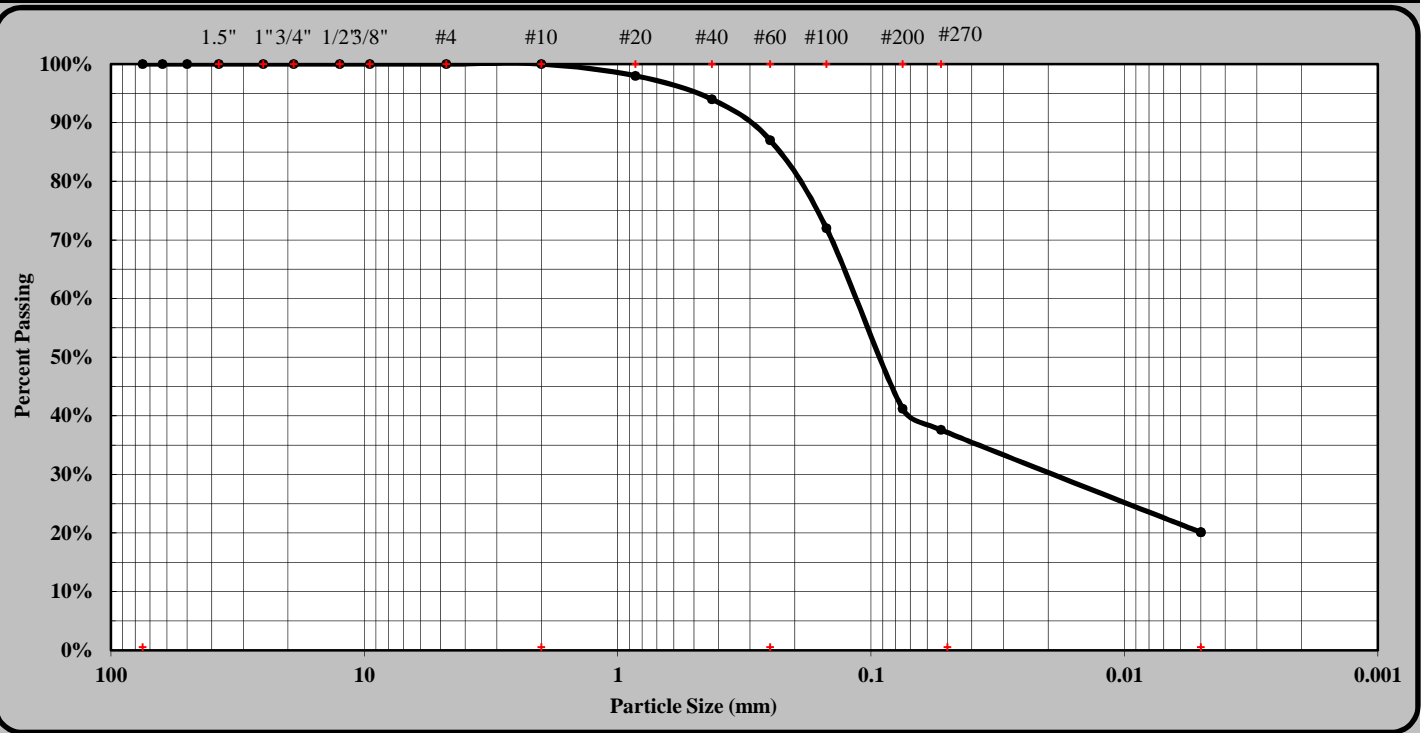
Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616				
S&ME Project #:	6235-16-010	Report Date:	11/8/16	
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/1-8/16	
State Project #:	46375.1.1	F.A. Project No:	N/A	
Client Name:	Michael Baker Engineering	TIP NO:	R-5703	
Address:	Raleigh, NC			
Boring #:	L-17301	Sample #:	SS-22	
Location:	173+01	Sample Date:	9/27/16	
	Offset:	4' RT	Depth (ft):	2.0-3.5'
Sample Description:	Sandy SILT A-4 (0)			

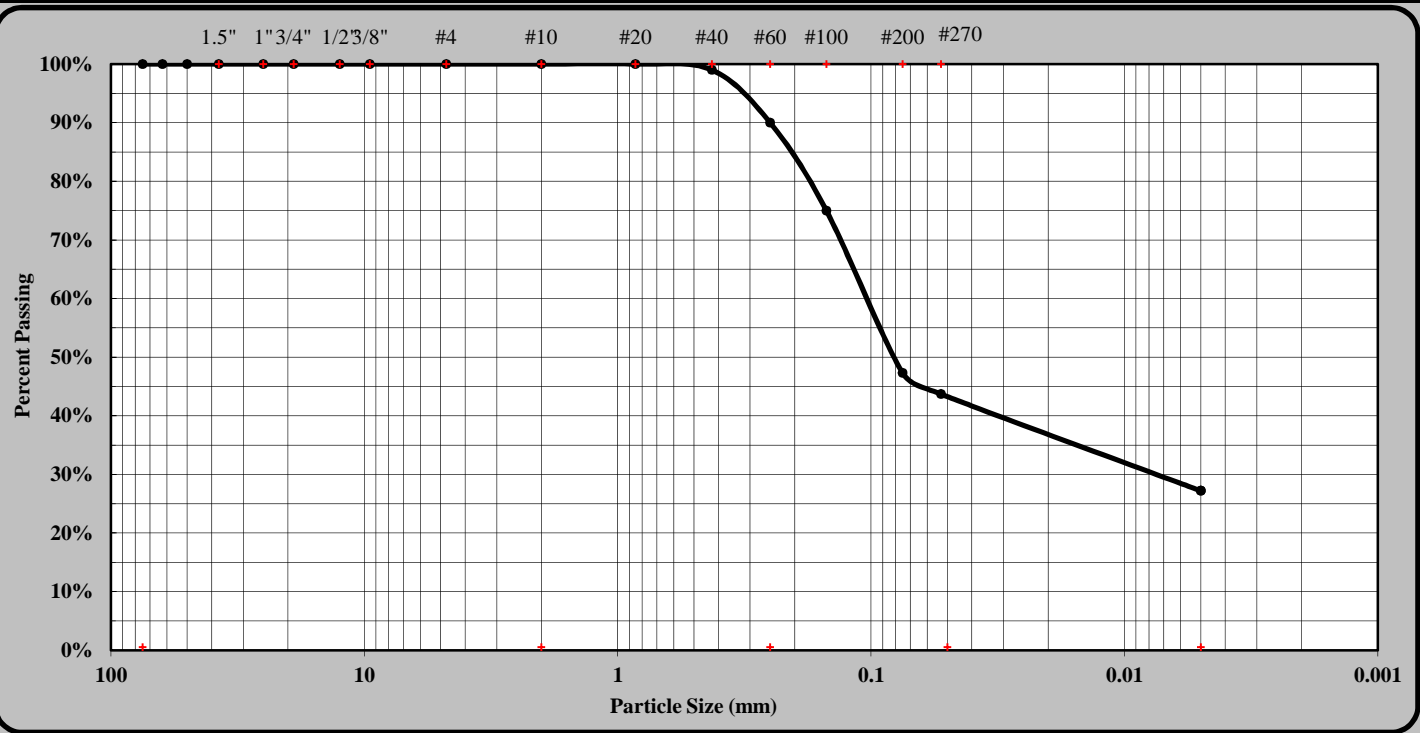


As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#10	Coarse Sand	13%	Silt	18%
Gravel	0%	Fine Sand	49%	Clay	20%
Apparent Relative Density	2.650	Moisture Content	17.7%	% Passing #200	41.2%
Liquid Limit	21	Plastic Limit	12	Plastic Index	9
Soil Mortar (-#10 Sieve)					
Coarse Sand	13%	Fine Sand	49%	Silt	18%
				Clay	20%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>		Angular	<input checked="" type="checkbox"/>
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input checked="" type="checkbox"/>	Weathered & Friable	<input checked="" type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Karen Warner	118-06-0305	Laboratory Technician	
Technician Name	Certification No.	Position	Date
Stewart Laney, P.E		Senior Engineer	
Technical Responsibility	Signature	Position	Date
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/8/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/1-8/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-18000	Sample #:	SS-23
Location:	180+00	Sample Date:	9/14/16
		Offset:	CL
		Depth (ft):	2.0-3.5'
Sample Description:	Sandy CLAY A-6 (5)		

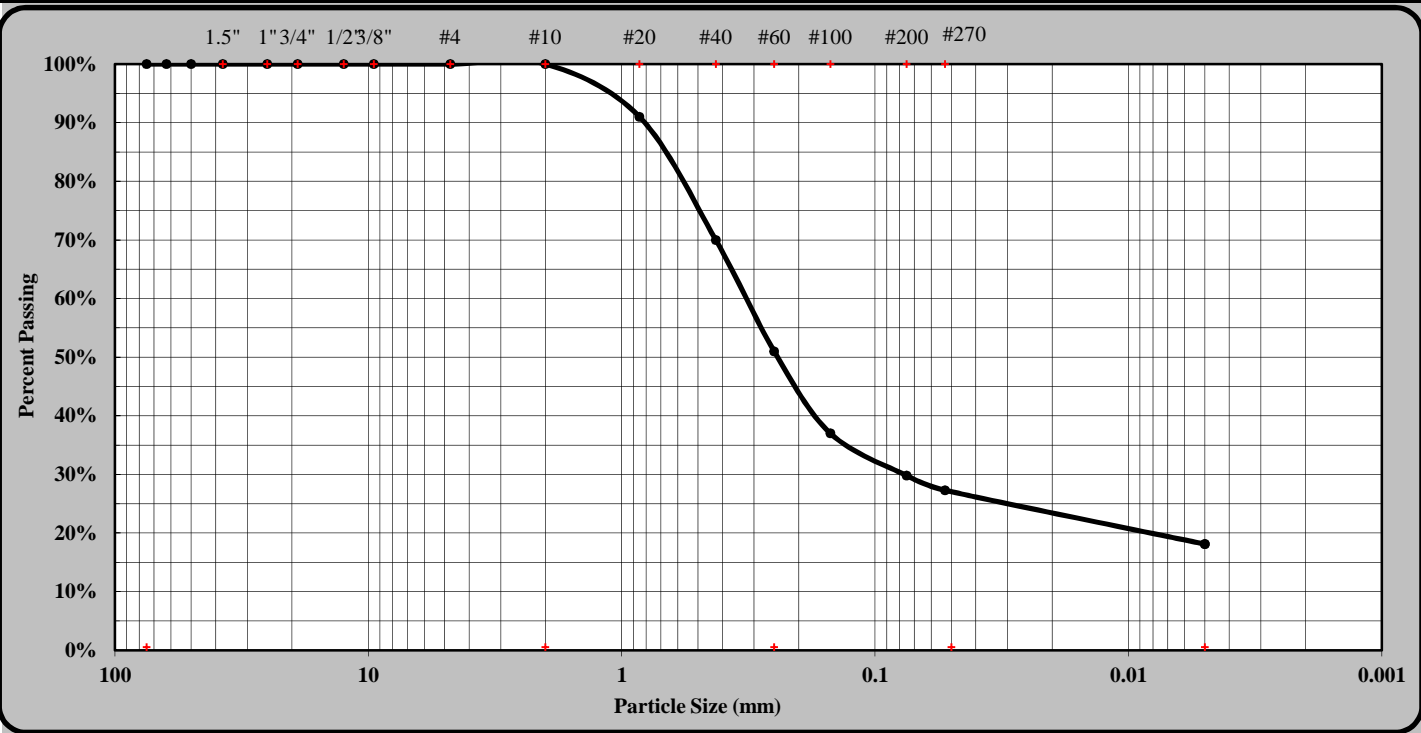


As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#20	Coarse Sand	10%	Silt	17%
Gravel	0%	Fine Sand	46%	Clay	27%
Apparent Relative Density	2.650	Moisture Content	18.3%	% Passing #200	47.3%
Liquid Limit	32	Plastic Limit	13	Plastic Index	19
Soil Mortar (-#10 Sieve)					
Coarse Sand	10%	Fine Sand	46%	Silt	17%
				Clay	27%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>		Angular	<input checked="" type="checkbox"/>
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

<u>Karen Warner</u> Technician Name	<u>118-06-0305</u> Certification No.	<u>Laboratory Technician</u> Position	 Date
<u>Stewart Laney, P.E</u> Technical Responsibility	 Signature	<u>Senior Engineer</u> Position	 Date
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/8/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/1-8/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-18600	Sample #:	SS-24
Location:	186+00	Sample Date:	9/14/16
		Offset:	CL
		Depth (ft):	2.0-3.5'
Sample Description:	Silty SAND A-2-4 (0)		



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#10	Coarse Sand	49%	Silt	9%
Gravel	0%	Fine Sand	24%	Clay	18%
Apparent Relative Density	2.650	Moisture Content	18.0%	% Passing #200	29.8%
Liquid Limit	21	Plastic Limit	11	Plastic Index	10
Soil Mortar (-#10 Sieve)					
Coarse Sand	49%	Fine Sand	24%	Silt	9%
				Clay	18%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>		Angular	<input checked="" type="checkbox"/>
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

<u>Karen Warner</u> Technician Name	<u>118-06-0305</u> Certification No.	<u>Laboratory Technician</u> Position	<u>11/8/2016</u> Date
<u>Stewart Laney, P.E</u> Technical Responsibility	 Signature	<u>Senior Engineer</u> Position	 Date
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Form No: TR-T267  
Revision No. 0  
Revision Date: 07/10/08

Moisture, Ash, and Organic Matter



AASHTO T-267

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616			
Project #:	6235-16-010	Report Date:	10/21/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/18 - 10/21/16
Client Name:	Michael Baker Engineering		
Client Address:	Raleigh, NC		
Boring #:	L-RT-20155	Sample #:	SS-31
Location:	201+55	Offset:	29' RT
		Sample Date:	8/23/16
		Depth (ft):	2.3 - 3.8
Sample Description: Tan Silty Clayey Coarse to Fine SAND (A-2-4) (0)			
Equipment: Balance: 0.01 g.Readability, 500g. Minimum Capaccity			
Balance: S&ME ID #: 1024 Cal. Date: 11/06/16 Due: 11/06/17			

Method A: Moisture Content Determination

Required Oven Temperature:105 ± 5° C

Oven Temperature: 105 °C		Tare #	t
t	Tare Weight (Dish plus Aluminum Foil Cover)	grams	48.00
a	Mass of As-Received Specimen + Tare Wt.	grams	94.87
b	Mass of Oven Dry Specimen + Tare Wt.	grams	89.76
w	Water Weight	(a-b)	5.11
A	Mass of As-Received Specimen	(a-t)	46.87
B	Mass of Oven Dry Specimen	(b-t)	41.76
% Moisture Content as a % of As Received or Total Mass		(w/A)*100	10.9%
% Moisture Content as a % of Oven-dried Mass		(w/B)*100	12.2%

Oven	S&ME ID #:	1454	Cal. Date:	10/7/16	Due:	10/7/17
------	------------	------	------------	---------	------	---------

Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination

Muffle Furnace: 455 °C		Tare #	11
t	Tare Weight (Dish plus Aluminum Foil Cover)	grams	13.60
b	Mass of Oven Dry Specimen + Tare Wt.	grams	39.45
c	Ash Weight + Tare Wt.	grams	39.26
C	Ash Weight	c-t	25.66
B	Mass of Oven Dry Specimen	(b-t)	25.85
D	% Ash Content	(C/B)*100	99.3%
	% Organic Matter	100-D	0.7%

Muffle Furnace:	S&ME ID #:	00261
-----------------	------------	-------

Notes / Deviations / References:

Mal Krajan, ET		Laboratory Manager	11/14/2016
Technical Responsibility	Signature	Position	Date
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Form No: TR-T289-1  
Revision No. 0  
Revision Date: 07/10/08

pH of Soil



AASHTO T289

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616							
Project #:	6235-16-010	Report Date:	11/7/16				
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/5 - 11/7/16				
Client Name:	Michael Baker Engineering						
Client Address:	Raleigh, NC						
Boring #:	L-RT-20155	Sample #:	SS-31	Sample Date:	8/23/16		
Location:	201+55	Offset:	29' RT	Depth (ft):	2.3 - 3.8		
Sample Description: Tan Silty Clayey Coarse to Fine SAND (A-2-4) (0)							
Equipment:							
Balance	S&ME ID#	1024	Cal. Date:	11/6/16	Due:	11/6/17	
Sieve:	#10	S&ME ID#	13223	Cal. Date:	6/11/16	Due:	6/11/17
pH Meter:	S&ME ID#	1365	Cal. Date:	11/7/16	Due:	NA	

pH Meter Calibration

Buffer Solution	Results
pH buffer 7.0	7.02
pH buffer 4.01	4.01
pH buffer 10.0	10.03
Buffer Temperature °C	22.4

Measuring pH of Soil

Measurements	
Weightt of Air Dry Soil (g)	20.01
Distilled Water (g)	20.02
Temperature °C	21.4
pH Readings	5.89

Notes / Deviations / References: AASHTO T-289: Determining pH of Soil for Use in Corrosion Testing

Mal Krajan, ET		Laboratory Manager	11/14/2016
Technical Responsibility	Signature	Position	Date
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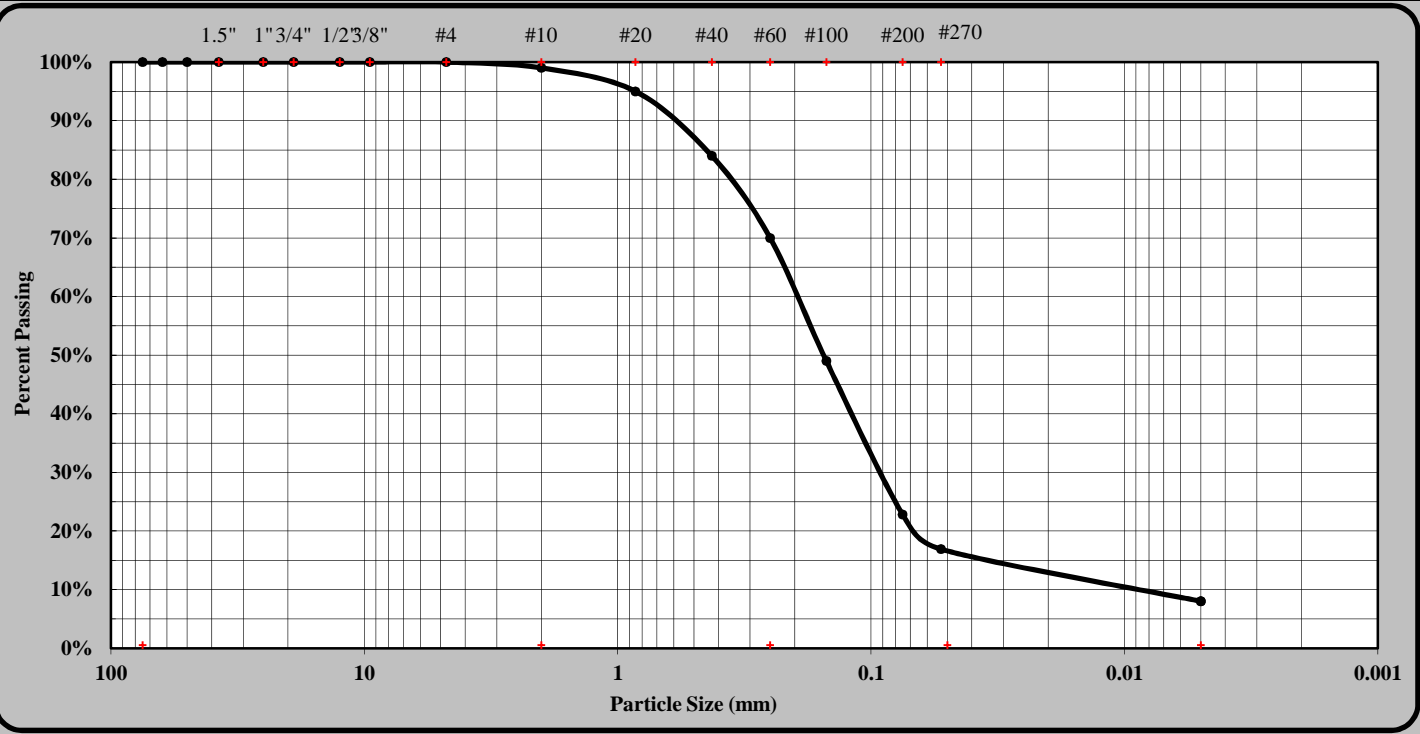






S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	6235-16-010	Report Date:	11/14/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/14/16
State Project #:	46375.1.1	F.A. Project No:	N/A
		TIP NO:	R-5703
Client Name:	Michael Baker Engineering		
Address:	Raleigh, NC		
Boring #:	L-20294	Sample #:	CBR-3
		Sample Date:	N//16
Location:	202+94	Offset:	69' RT
		Depth (ft):	1.0 - 3.0
Sample Description:	Tan Silty Clayey Coarse to Fine SAND A-2-4 (0)		



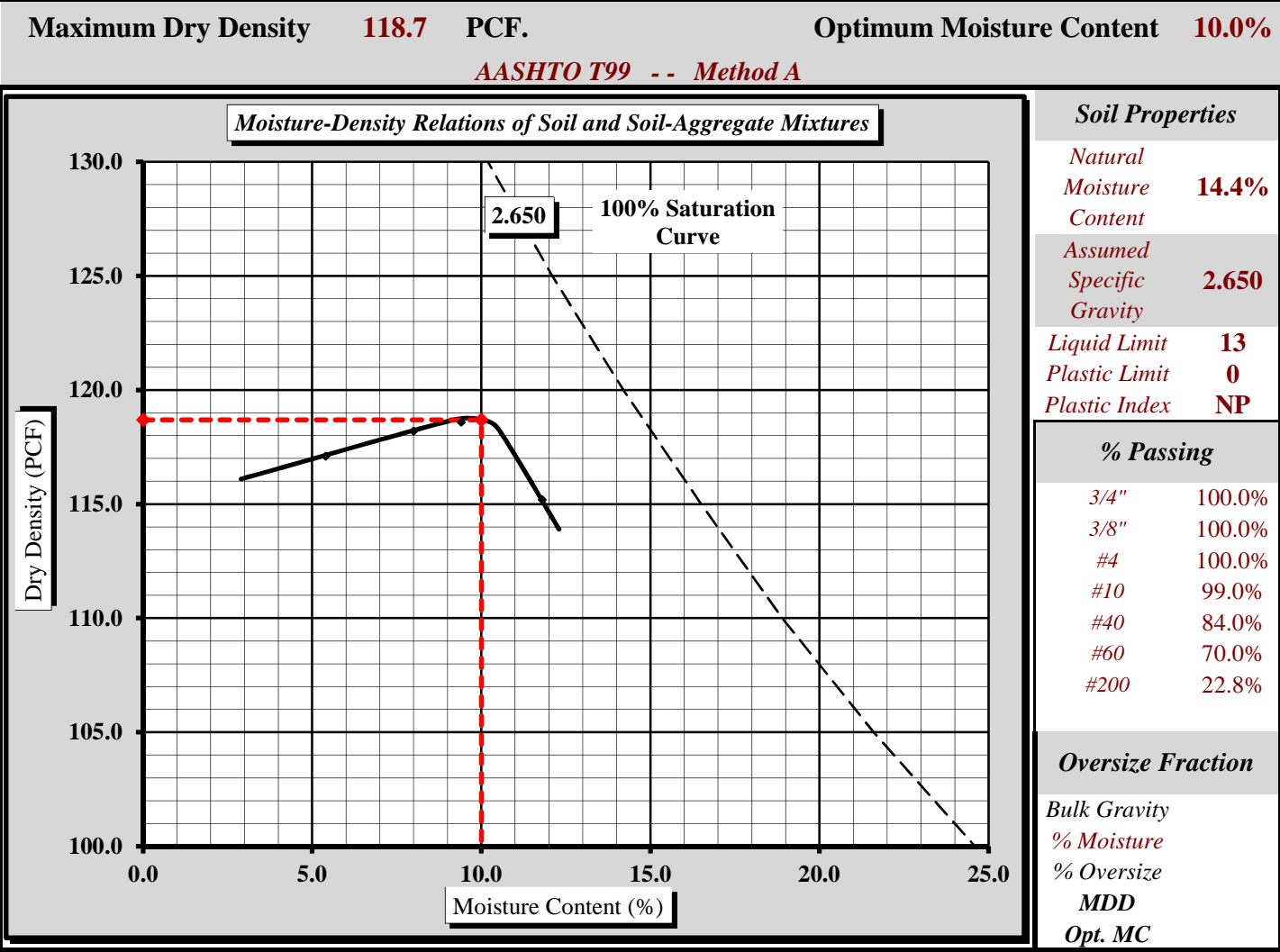
As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	3/8"	Coarse Sand	29%	Silt	9%
Gravel	1%	Fine Sand	53%	Clay	8%
Apparent Relative Density	ND	Moisture Content	14.4%	% Passing #200	22.8%
Liquid Limit	13	Plastic Limit	0	Plastic Index	N.P.
Soil Mortar (-#10 Sieve)					
Coarse Sand	29%	Fine Sand	54%	Silt	9%
				Clay	8%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>
Hard & Durable		Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	11/14/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	11/14/2016
Technical Responsibility	Signature	Position	Date
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	6235-16-010	Report Date:	10/10/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/5 - 10/10/16
Client Name:	Michael Baker		
Client Address:	Cary, NC		
Boring #:	L-20294	Sample #:	CBR-3
		Sample Date:	9/30/2016
Location:	202+94	Offset:	69' RT
		Depth:	1.0 - 3.0 ft
Sample Description:	Tan Silty Clayey Coarse to Fine SAND (A-2-4) (0)		



Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Overflow Fraction (ASTM D 4718) ☐  
Sieve Size used to separate the Overflow Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐  
Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: ND=Not Determined.  
ASTM D 422: Particle Size Analysis of Soils  
AASHTO T265: Laboratory Determination of Moisture Content of Soils  
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Mal Krajan, ET		Laboratory Manager	
Technical Responsibility	Signature	Position	Date
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CBR (California Bearing Ratio) of Laboratory  
Compacted Soil

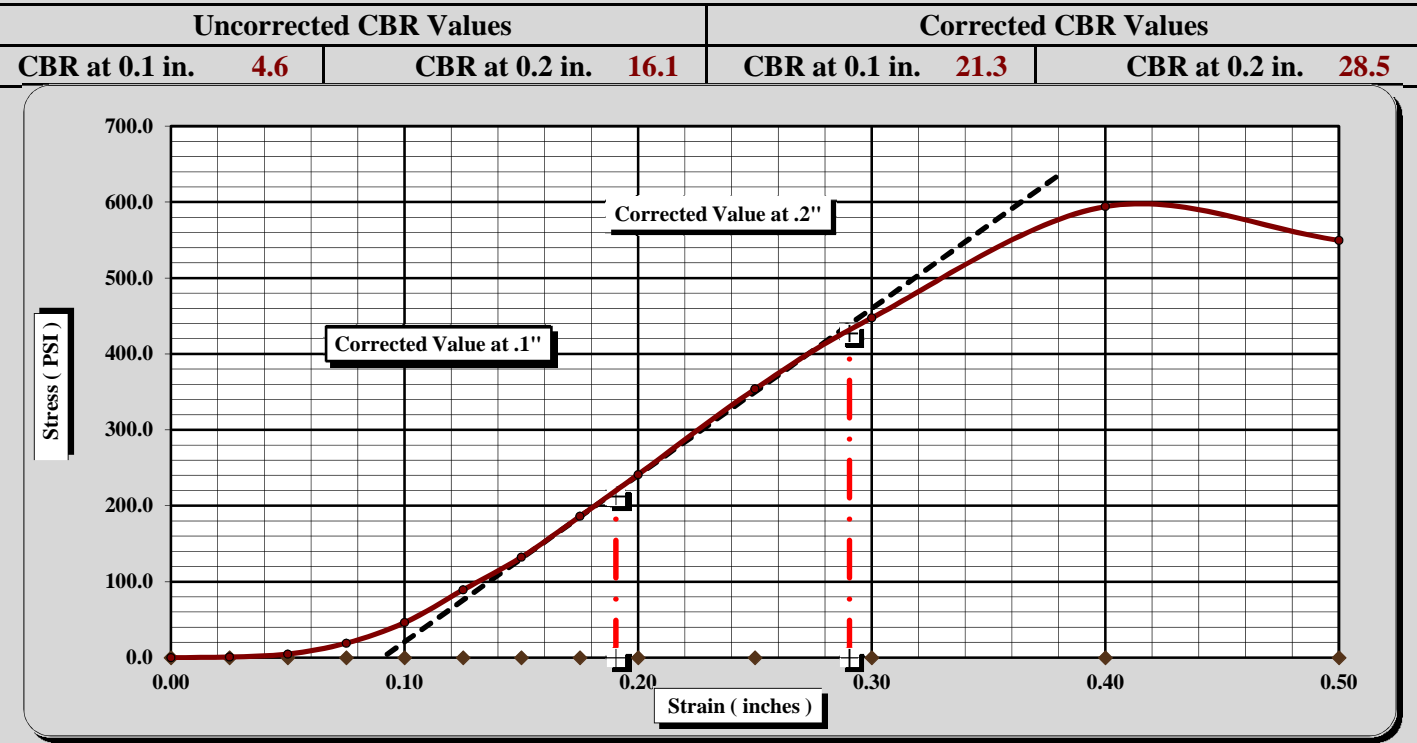
AASHTO T 193

Quality Assurance



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
Project #:	6235-16-010	Report Date:	10/17/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s)	10/7 - 10/17/16
Client Name:	Michael Baker		
Client Address:	Cary, NC		
Boring #:	L-20294	Sample #:	CBR-3
		Sample Date:	9/30/16
Location:	202+94	Offset:	69' RT
		Depth (ft):	1.0 - 3.0 ft
Sample Description: Tan Silty Clayey Coarse to Fine SAND (A-2-4) (0)			

AASHTO T99 Method A	Maximum Dry Density:	118.7 PCF	Optimum Moisture Content:	10.0%	
Compaction Test performed on grading complying with CBR spec.		% Retained on the 3/4" sieve:			0.0%



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	65	Final Dry Density (PCF)	118.5
Initial Dry Density (PCF)	118.3	Average Final Moisture Content	10.6%
Moisture Content of the Compacted Specimen	10.7%	Moisture Content (top 1" after soaking)	10.9%
Percent Compaction	99.7%	Percent Swell	-0.2%
Soak Time:	96-hr	Surcharge Weight	10.0
		Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	13	Plastic Index	NP

Notes/Deviations/References:

Test specimen was compacted to 100% at optimum moisture content.

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

10/15/2016

Date

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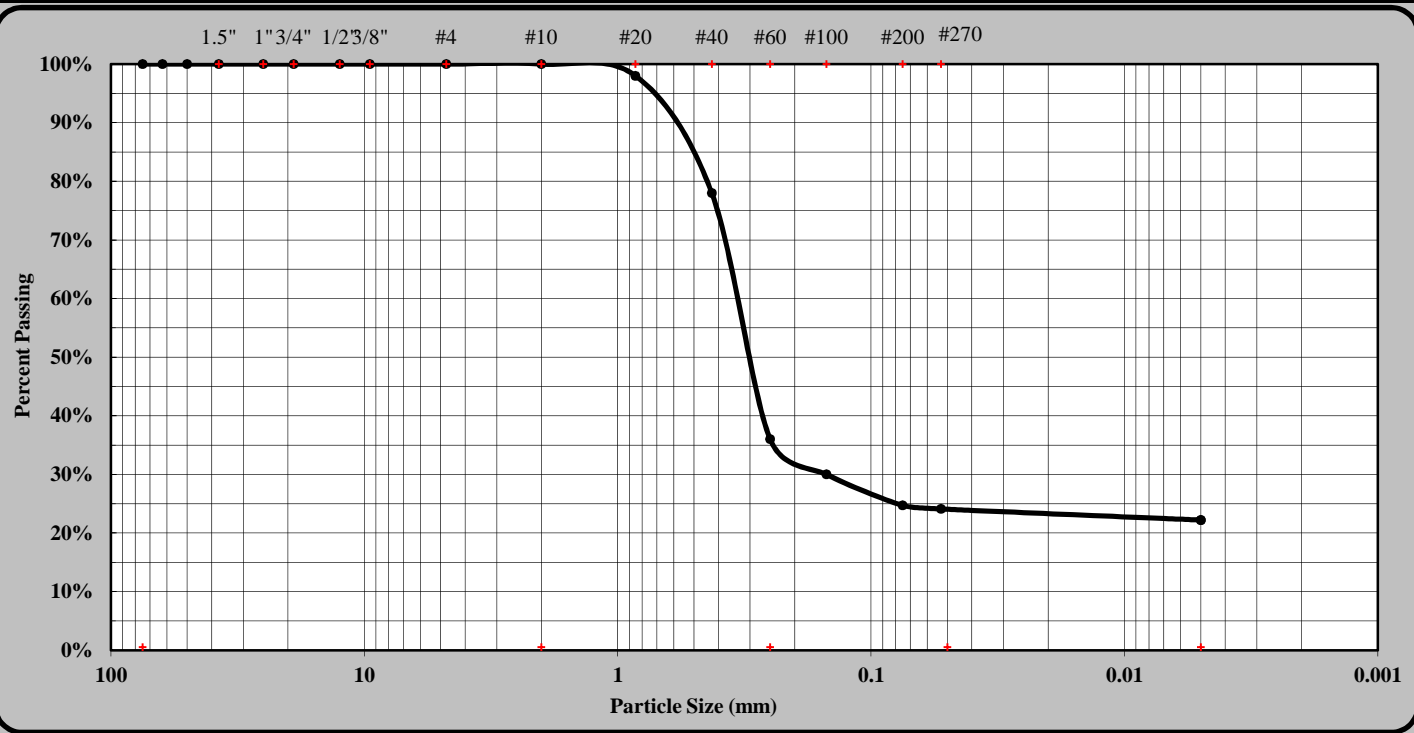
Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/8/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/1-8/16
State Project #:	46375.1.1	F.A. Project No:	N/A
		TIP NO:	R-5703
Client Name:	Michael Baker Engineering		
Address:	Raleigh, NC		
Boring #:	L-20600	Sample #:	SS-35
		Sample Date:	9/27/16
Location:	206+00	Offset:	9' RT
		Depth (ft):	2.0-3.5'
Sample Description:		Clayey SAND A-2-6 (0)	



As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm
Coarse Sand	< 2.00 mm and > 0.25 mm	Clay	< 0.005 mm

Maximum Particle Size	#20	Coarse Sand	64%	Silt	2%
Gravel	0%	Fine Sand	12%	Clay	22%
Apparent Relative Density	2.650	Moisture Content	14.8%	% Passing #200	24.7%
Liquid Limit	33	Plastic Limit	14	Plastic Index	19

Soil Mortar (-#10 Sieve)							
Coarse Sand	64%	Fine Sand	12%	Silt	2%	Clay	22%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular		<input checked="" type="checkbox"/>	
Hard & Durable		<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable		<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Karen Warner

Technician Name

118-06-0305

Certification No.

Laboratory Technician

Position

11/8/2016

Date

Stewart Laney, P.E

Technical Responsibility

Signature

Senior Engineer

Position

Date

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### Moisture, Ash, and Organic Matter

*Revision Date: 07/10/08*

### Quality Assurance

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pH of Soil

AASHTO T289

Quality Assurance



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616					
Project #:	6235-16-010	Report Date:	11/7/16		
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/5 - 11/7/16		
Client Name:	Michael Baker Engineering				
Client Address:	Raleigh, NC				
Boring #:	L-RT-21800	Sample #:	SS-46	Sample Date:	8/4/16
Location:	218+00	Offset:	35' RT	Depth (ft):	1.0 - 2.5
Sample Description: Tan Silty Clayey Coarse to Fine SAND (A-2-4) (0)					
Equipment:					
Balance		S&ME ID#	1024	Cal. Date:	11/6/16
Sieve:	#10	S&ME ID#	13223	Cal. Date:	6/11/16
pH Meter:		S&ME ID#	1365	Cal. Date:	11/7/16

pH Meter Calibration

Buffer Solution	Results
pH buffer 7.0	7.02
pH buffer 4.01	4.01
pH buffer 10.0	10.03
Buffer Temperature °C	22.4

Measuring pH of Soil

Measurements	
Weightt of Air Dry Soil (g)	30.02
Distilled Water (g)	30.02
Temperature °C	22.1
pH Readings	5.88

Notes / Deviations / References: AASHTO T-289: Determining pH of Soil for Use in Corrosion Testing


Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

11/14/2016

Date

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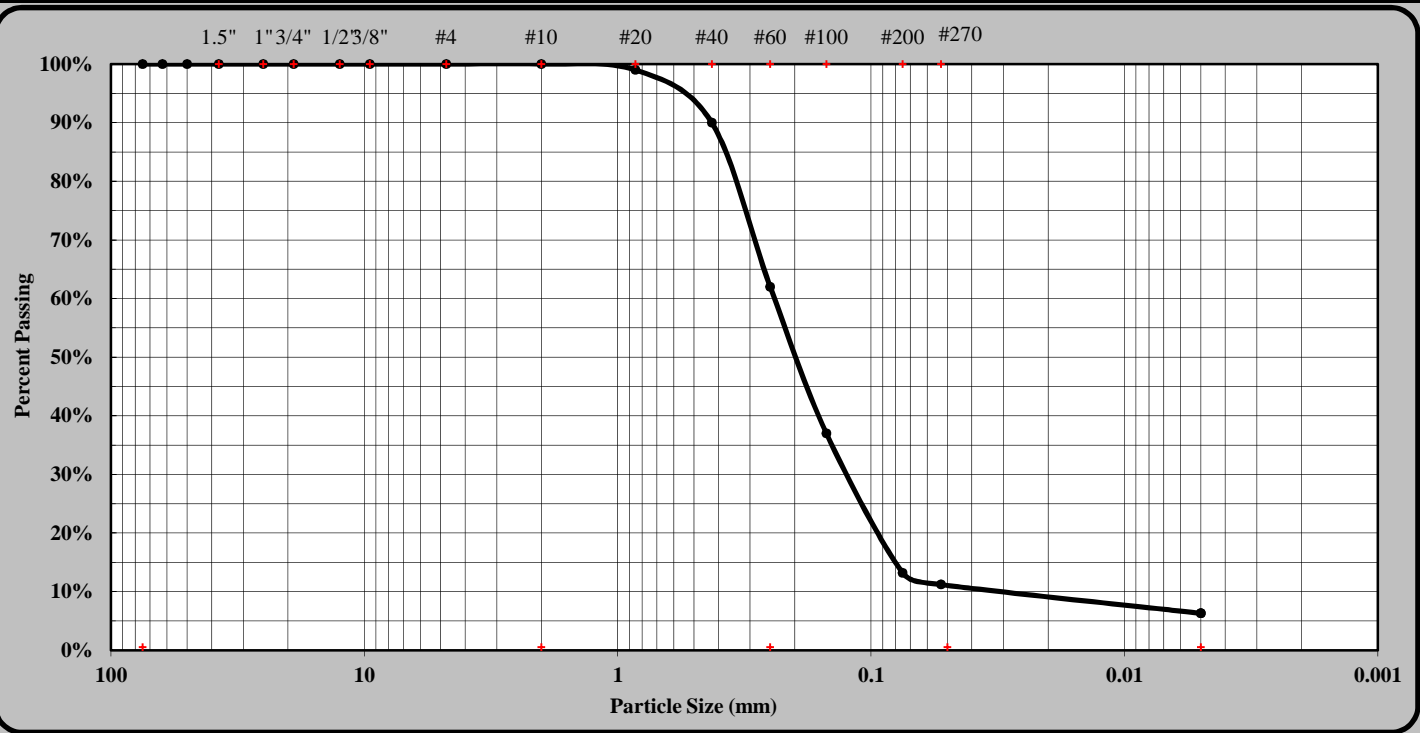
Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/14/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/14/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-RT-21800	Sample #:	SS-47
Location:	218+00	Sample Date:	8/4/16
	Offset:	35' RT	Depth (ft): 58.1 - 59.6
Sample Description: Dark Gray Silty Clayey Coarse to Fine SAND A-2-4 (0)			



As Defined by NCDOT			Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm		Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm		Clay		< 0.005 mm	
Maximum Particle Size	#4	Coarse Sand	38%	Silt	5%	
Gravel	0%	Fine Sand	51%	Clay	6%	
Apparent Relative Density	ND	Moisture Content	27.1%	% Passing #200	13.2%	
Liquid Limit	20	Plastic Limit	0	Plastic Index	N.P.	
Soil Mortar (-#10 Sieve)						
Coarse Sand	38%	Fine Sand	51%	Silt	5%	Clay 6%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular		<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable		<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

Position

11/14/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

11/14/2016

Date

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Form No: TR-T267  
Revision No. 0  
Revision Date: 07/10/08

Moisture, Ash, and Organic Matter



AASHTO T-267

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616			
Project #:	6235-16-010	Report Date:	10/21/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/18 - 10/21/16
Client Name:	Michael Baker Engineering		
Client Address:	Raleigh, NC		
Boring #:	L-RT-21800	Sample #:	SS-47
Location:	218+00	Offset:	35' RT
Sample Description: Dark Gray Silty Clayey Coarse to Fine SAND (A-2-4) (0)			
Equipment: Balance: 0.01 g.Readability, 500g. Minimum Capaccity			
Balance:	S&ME ID #:	1024	Cal. Date: 11/06/16 Due: 11/06/17

Method A: Moisture Content Determination

Required Oven Temperature:105 ± 5° C

Oven Temperature: 105 °C		Tare #	m
t	Tare Weight (Dish plus Aluminum Foil Cover)	grams	48.80
a	Mass of As-Received Specimen + Tare Wt.	grams	92.58
b	Mass of Oven Dry Specimen + Tare Wt.	grams	83.24
w	Water Weight	(a-b)	9.34
A	Mass of As-Received Specimen	(a-t)	43.78
B	Mass of Oven Dry Specimen	(b-t)	34.44
% Moisture Content as a % of As Received or Total Mass		(w/A)*100	21.3%
% Moisture Content as a % of Oven-dried Mass		(w/B)*100	27.1%

Oven	S&ME ID #:	1454	Cal. Date:	10/7/16	Due:	10/7/17
------	------------	------	------------	---------	------	---------

Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination

Muffle Furnace: 455 °C		Tare #	49
t	Tare Weight (Dish plus Aluminum Foil Cover)	grams	49.46
b	Mass of Oven Dry Specimen + Tare Wt.	grams	83.89
c	Ash Weight + Tare Wt.	grams	83.65
C	Ash Weight	c-t	34.19
B	Mass of Oven Dry Specimen	(b-t)	34.43
D	% Ash Content	(C/B)*100	99.3%
	% Organic Matter	100-D	0.7%

Muffle Furnace:	S&ME ID #:	00261
-----------------	------------	-------

Notes / Deviations / References:

Mal Krajan, ET		Laboratory Manager	11/14/2016
Technical Responsibility	Signature	Position	Date
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Form No: TR-T289-1  
Revision No. 0  
Revision Date: 07/10/08

pH of Soil



AASHTO T289

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
Project #:	6235-16-010	Report Date:	11/7/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/5 - 11/7/16
Client Name:	Michael Baker Engineering		
Client Address:	Raleigh, NC		
Boring #:	L-RT-21800	Sample #:	SS-47
Location:	218+00	Offset:	35' RT
Sample Description: Dark Gray Silty Clayey Coarse to Fine SAND (A-2-4) (0)			
Equipment:			
Balance	S&ME ID#	1024	Cal. Date: 11/6/16 Due: 11/6/17
Sieve:	#10	S&ME ID#	13223
pH Meter:	S&ME ID#	1365	Cal. Date: 11/7/16 Due: NA

pH Meter Calibration

Buffer Solution	Results
pH buffer 7.0	7.02
pH buffer 4.01	4.01
pH buffer 10.0	10.03
Buffer Temperature °C	22.4

Measuring pH of Soil

Measurements	
Weightt of Air Dry Soil (g)	20.00
Distilled Water (g)	20.01
Temperature °C	21.8
pH Readings	6.01

Notes / Deviations / References: AASHTO T-289: Determining pH of Soil for Use in Corrosion Testing

Mal Krajan, ET		Laboratory Manager	11/14/2016
Technical Responsibility	Signature	Position	Date
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Form No. TR-D698-2

Revision No. : 0

Revision Date: 11/21/07

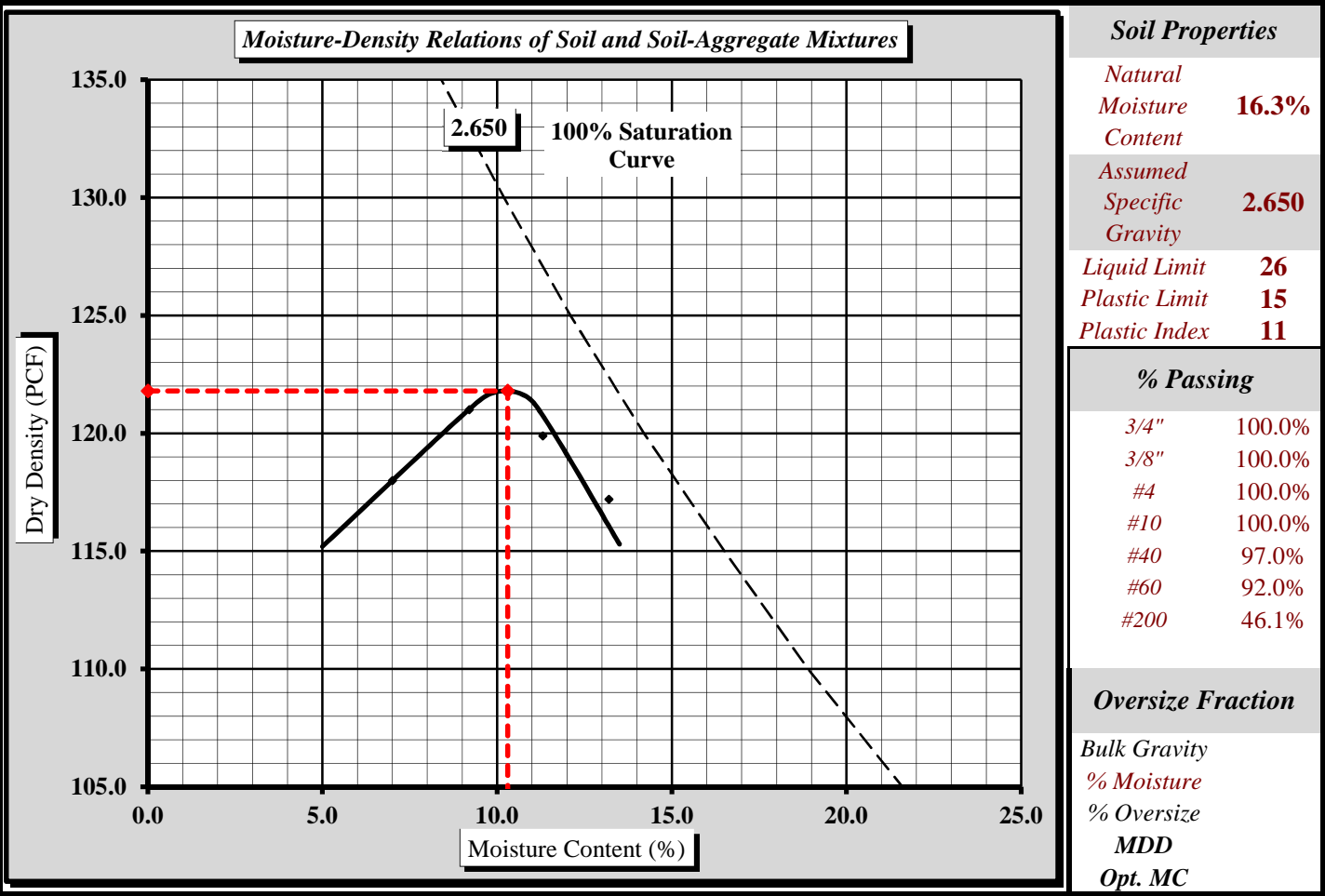
Moisture - Density Report



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	10/10/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/5 - 10/10/16
Client Name:	Michael Baker		
Client Address:	Cary, NC		
Boring #:	L-24300	Sample #:	CBR-4
Location:	243+00	Sample Date:	9/15/2016
		Offset:	2' RT
		Depth:	1.0 - 3.0 ft
Sample Description:	Tan-Brown Coarse to Fine Sandy Silty CLAY (A-6) (2)		

Maximum Dry Density	121.8	PCF.	Optimum Moisture Content	10.3%
AASHTO T99 - - Method A				



Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐  
Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐  
Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: ND=Not Determined.  
ASTM D 422: Particle Size Analysis of Soils  
AASHTO T265: Laboratory Determination of Moisture Content of Soils  
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Mal Krajan, ET		Laboratory Manager	
Technical Responsibility	Signature	Position	Date
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Form No. TR-D1833-T193-3

Revision No. 0

Revision Date: 2/6/08

CBR (California Bearing Ratio) of Laboratory  
Compacted Soil

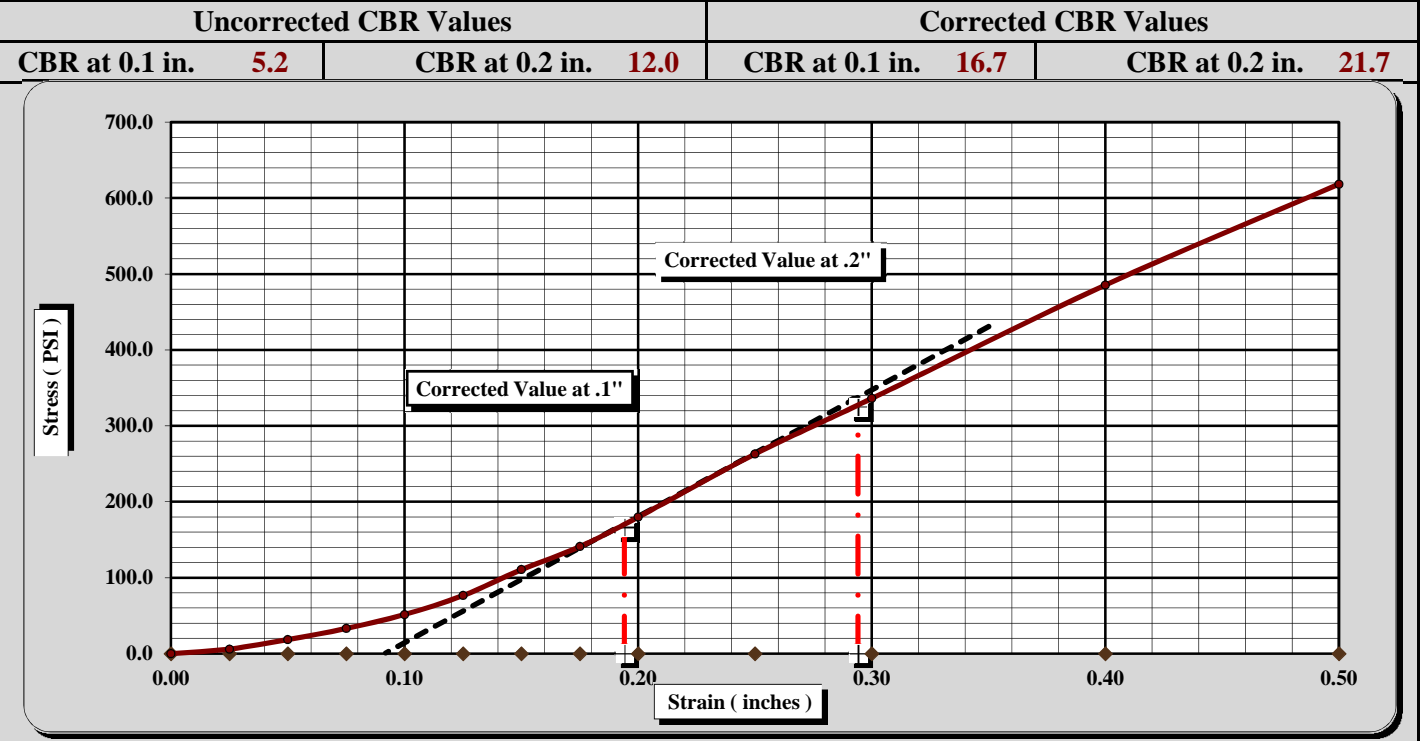
AASHTO T 193



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
Project #:	6235-16-010	Report Date:	10/17/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s)	10/7 - 10/17/16
Client Name:	Michael Baker		
Client Address:	Cary, NC		
Boring #:	L-24300	Sample #:	CBR-4
Location:	243+00	Sample Date:	9/15/16
		Offset:	2' RT
		Depth (ft):	1.0 - 3.0 ft
Sample Description:	Tan-Brown Coarse to Fine Sandy Silty CLAY (A-6) (2)		

AASHTO T99 Method A	Maximum Dry Density:	121.8	PCF	Optimum Moisture Content:	10.3%
Compaction Test performed on grading complying with CBR spec.				% Retained on the 3/4" sieve:	0.0%



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	65	Final Dry Density (PCF)	124.4
Initial Dry Density (PCF)	124.5	Average Final Moisture Content	10.6%
Moisture Content of the Compacted Specimen	10.5%	Moisture Content (top 1" after soaking)	10.8%
Percent Compaction	102.2%	Percent Swell	-0.1%
Soak Time:	96-hr	Surcharge Weight	10.0
Liquid Limit	26	Surcharge Wt. per sq. Ft.	50.9
		Plastic Index	11

Notes/Deviations/References:  
Test specimen was compacted to 100% at optimum moisture content.

Mal Krajan, ET		Laboratory Manager	10/15/2016
Technical Responsibility	Signature	Position	Date
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Oedometer Settlement Tests

Sample details

Sketch showing specimen location in original Sample



Depth 3.5 - 5.0 ft.  
Description: Tan-Brown Coarse to Fine Sandy Silty CLAY (A-6) (5)  
  
Type Undisturbed  
Height  $H_0$  (in) 0.999  
Diameter  $D_0$  (in) 2.501  
Weight  $W_0$  (gr) 165.74  
Bulk Density  $\rho$  (PCF) 128.65  
Particle Density  $\rho_s$  2.667 (measured)

Initial Conditions

Settlement Channel 1065  
Moisture Content  $w_0\%$  17.9  
Dry Density  $\rho_d$  (PCF) 109.09  
Voids Ratio  $e_0$  0.5256  
Deg of Saturation  $S_0\%$  91.0  
Swelling Pressure  $S_s$  (TSF) 0.000

Final Conditions

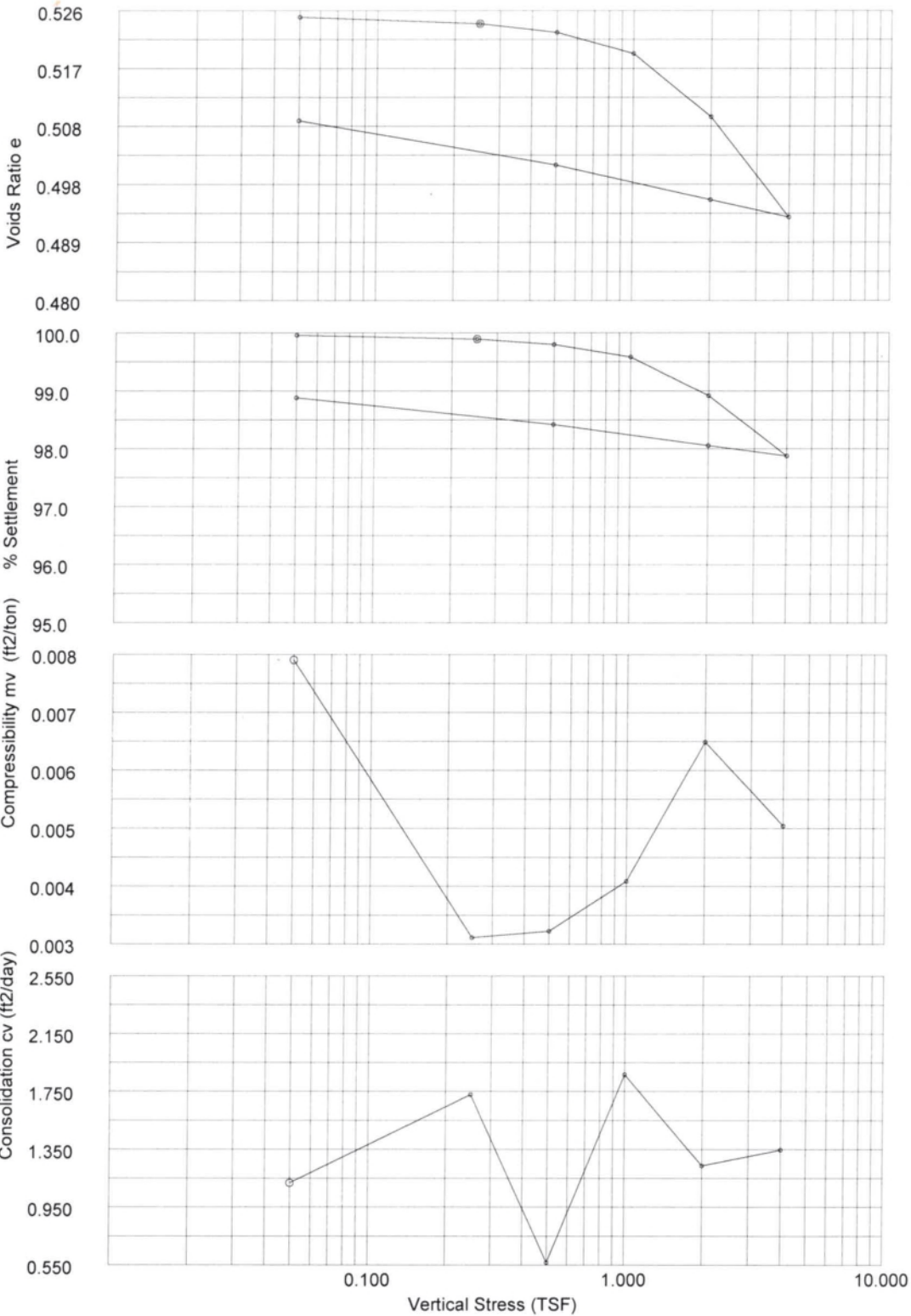
Moisture Content  $w_f\%$  20.0  
Dry Density  $\rho_d$  (PCF) 110.32  
Voids Ratio  $e_f$  0.5085  
Deg of Saturation  $S_f\%$  100.00  
Settlement: (in) 0.011  
Compression Index  $C_c$  0.050

Notes: Test specimen taken from the middle portion of UD tube.



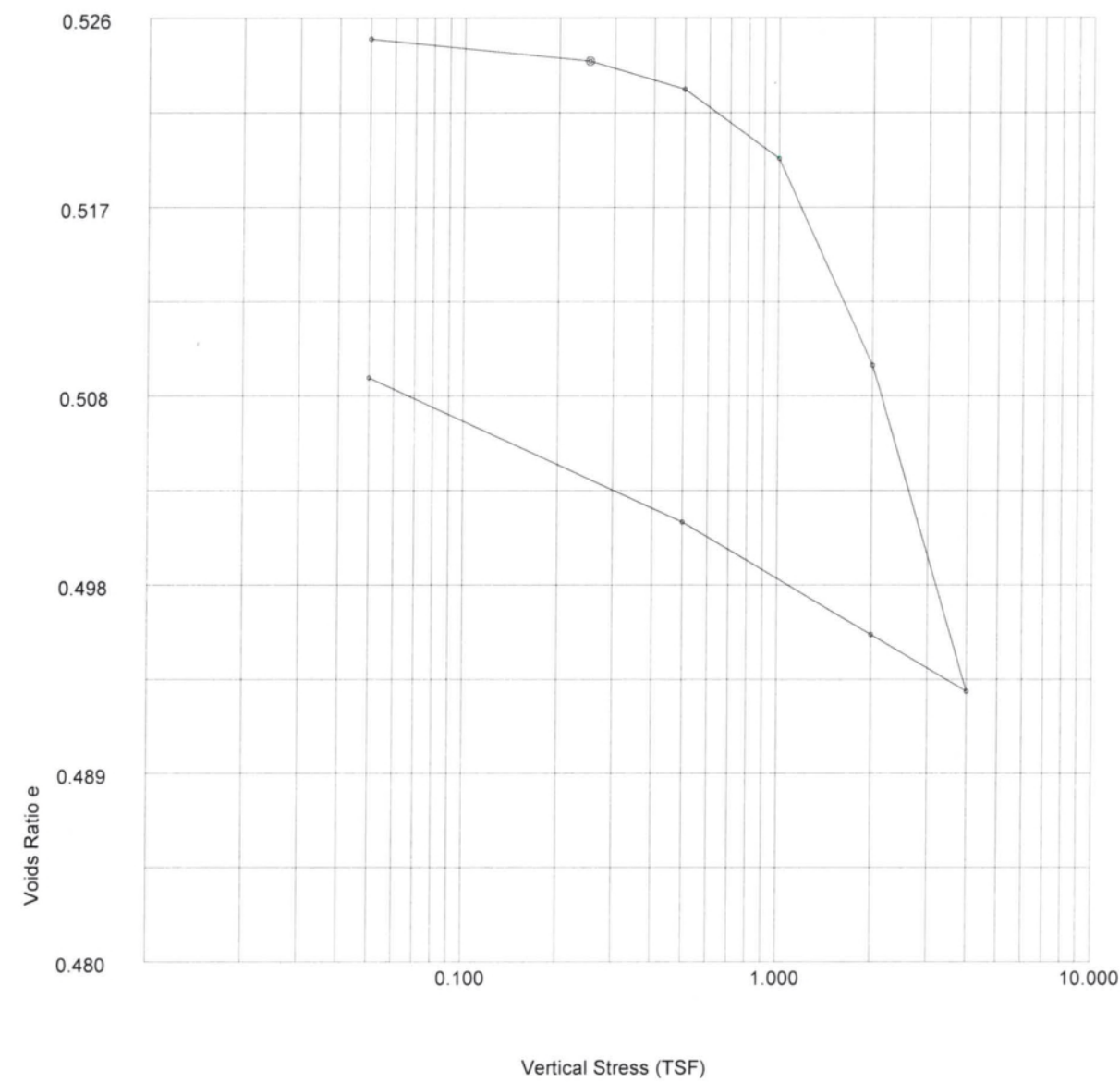
ASTM D2435-96		Test name Consolidation	
Site Reference: C.F. Harvey		Date of Test: 12-1-16	
Jobfile: E:\16010.JOB		Sample: ST-7	
Operator: MK		Borehole: L-24600	
Checked: MK		Approved:	

Oedometer Settlement Tests

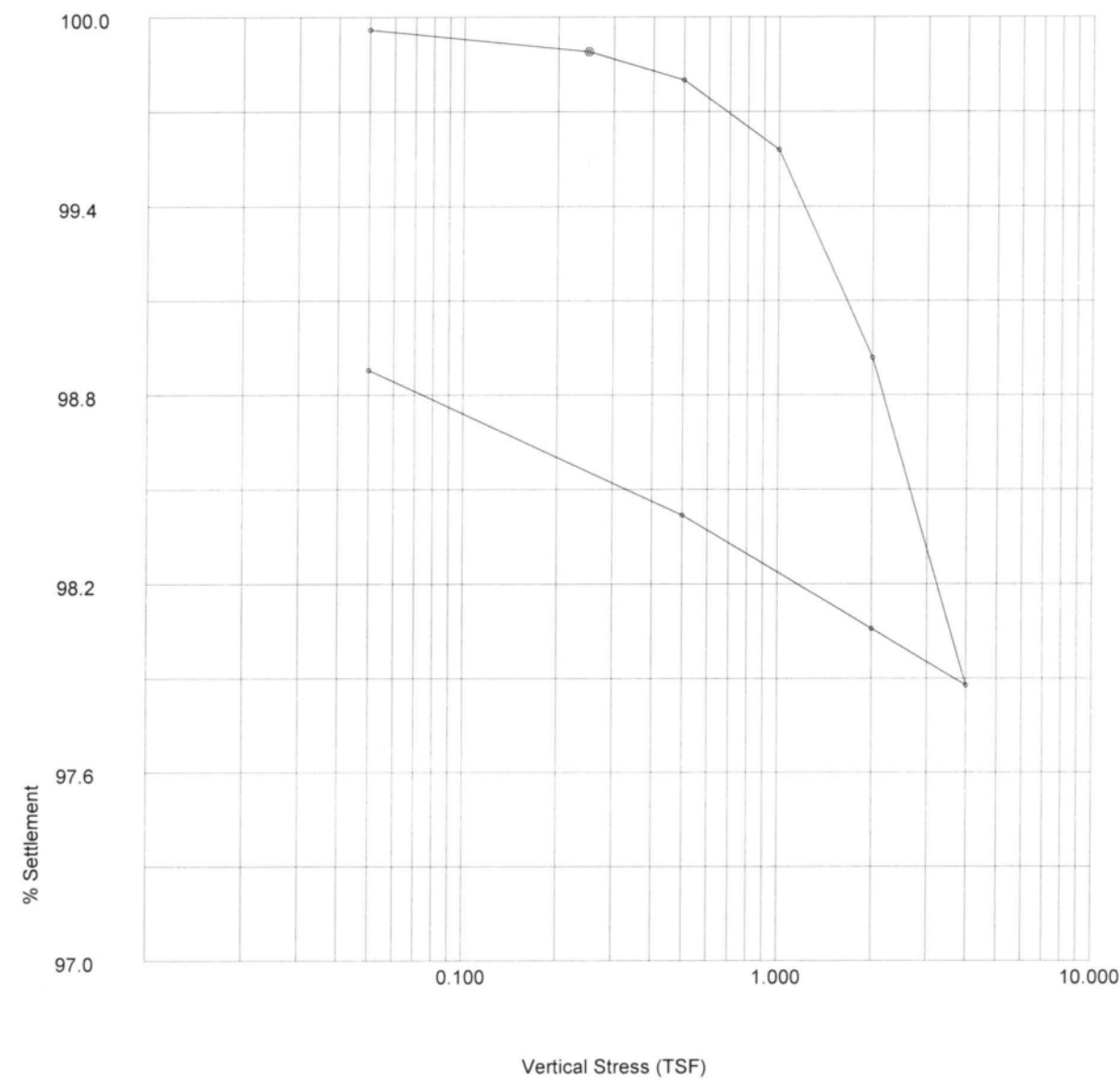


ASTM D2435-96		Test name Consolidation	
Site Reference: C.F. Harvey		Date of Test: 12-1-16	
Jobfile: E:\16010.JOB		Sample: ST-7	
Operator: MK		Borehole: L-24600	
Checked: MK		Approved:	

Oedometer Settlement Tests



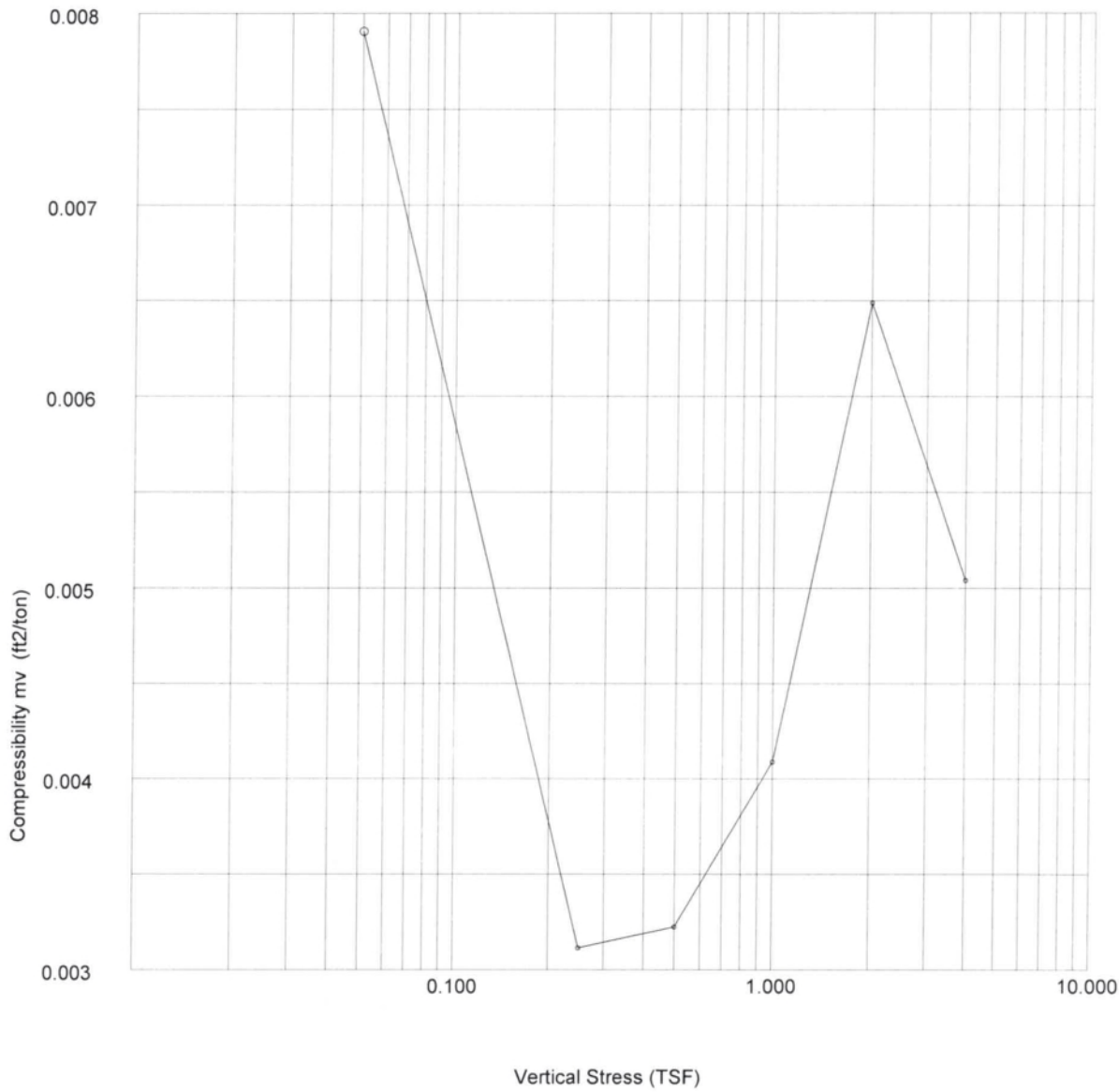
Oedometer Settlement Tests



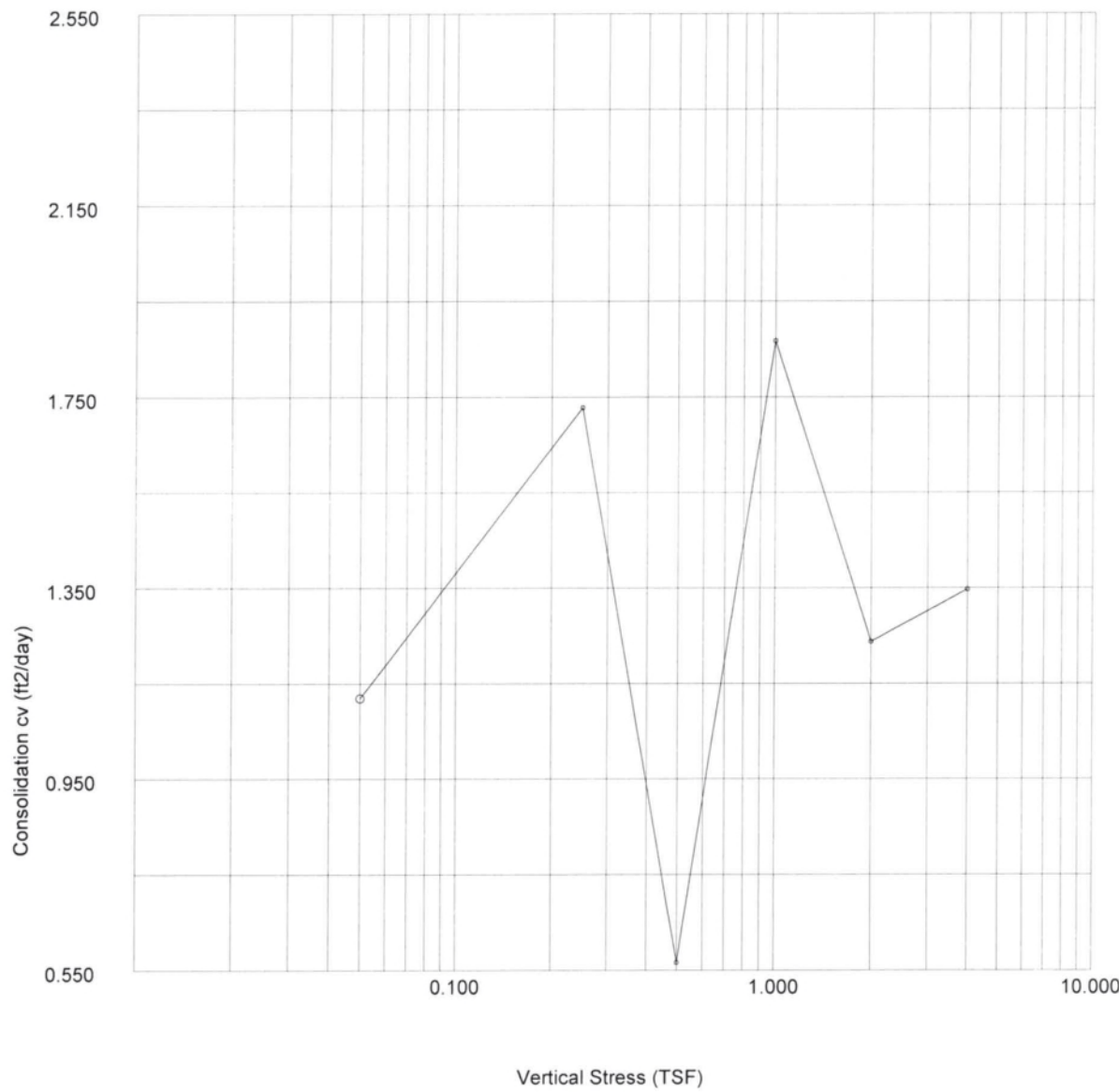
	ASTM D2435-96		Test name	Consolidation
			Date of Test:	12-1-16
	Site Reference:	C.F. Harvey	Sample:	ST-7
	Jobfile:	E:\16010.JOB	Borehole:	L-24600
Operator: <i>mlk</i>		Checked: <i>mlk</i>	Approved:	

	ASTM D2435-96		Test name	Consolidation
			Date of Test:	12-1-16
	Site Reference:	C.F. Harvey	Sample:	ST-7
	Jobfile:	E:\16010.JOB	Borehole:	L-24600
Operator: <i>mlk</i>		Checked: <i>mlk</i>	Approved:	

Oedometer Settlement Tests



Oedometer Settlement Tests




ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	12-1-16
Jobfile: E:\16010.JOB		Sample:	ST-7
Operator: <i>mlc</i>		Borehole:	L-24600
Checked: <i>mlc</i>		Approved:	



ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	12-1-16
Jobfile: E:\16010.JOB		Sample:	ST-7
Operator: <i>mlc</i>		Borehole:	L-24600
Checked: <i>mlc</i>		Approved:	

Oedometer Settlement Tests

Stress (TSF)	Initial Temp. oC	Settlement Total (in)	Cal Corr. (in)	Final Temp. oC	Voids Ratio e <sub>f</sub>	t <sub>90</sub> (mins)	Secondary Compr C <sub>sec</sub>	c <sub>v</sub> (ft2/day)	m <sub>v</sub> (ft2/ton)
0.050	21.6	0.0004	0.0	21.6	0.5250	1.890	0.00	1.119	0.008
0.250	21.6	0.0011	0.0	21.6	0.5239	1.223	0.00	1.728	0.004
0.500	21.6	0.0020	0.0	21.6	0.5225	3.725	0.00	0.566	0.004
1.000	21.6	0.0042	0.0	21.6	0.5192	1.126	0.00	1.868	0.004
2.000	21.6	0.0108	0.0	21.6	0.5091	1.684	0.00	1.237	0.007
4.000	21.6	0.0212	0.0	21.6	0.4932	1.521	0.00	1.347	0.005
2.000	21.6	0.0194	0.0	21.6	0.4960				0.001
0.500	21.6	0.0158	0.0	21.6	0.5015				0.002
0.050	21.6	0.0112	0.0	21.6	0.5085				0.010

	ASTM D2435-96		Test name Consolidation		
			Date of Test: 12-1-16		
	Site Reference: C.F. Harvey		Sample: ST-7		
	Jobfile: E:\16010.JOB		Borehole: L-24600		
Operator: <i>mk</i>		Checked: <i>mk</i>		Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	0	0.0000	0.0000
2	0.017	1	0.0001	0.0001
3	0.167	1	0.0001	0.0001
4	0.417	2	0.0002	0.0002
5	0.917	2	0.0002	0.0002
6	1.917	3	0.0003	0.0003
7	3.917	3	0.0003	0.0003
8	7.917	4	0.0004	0.0004
9	14.917	4	0.0004	0.0004
10	29.917	4	0.0004	0.0004
11	34.113	4	0.0004	0.0004

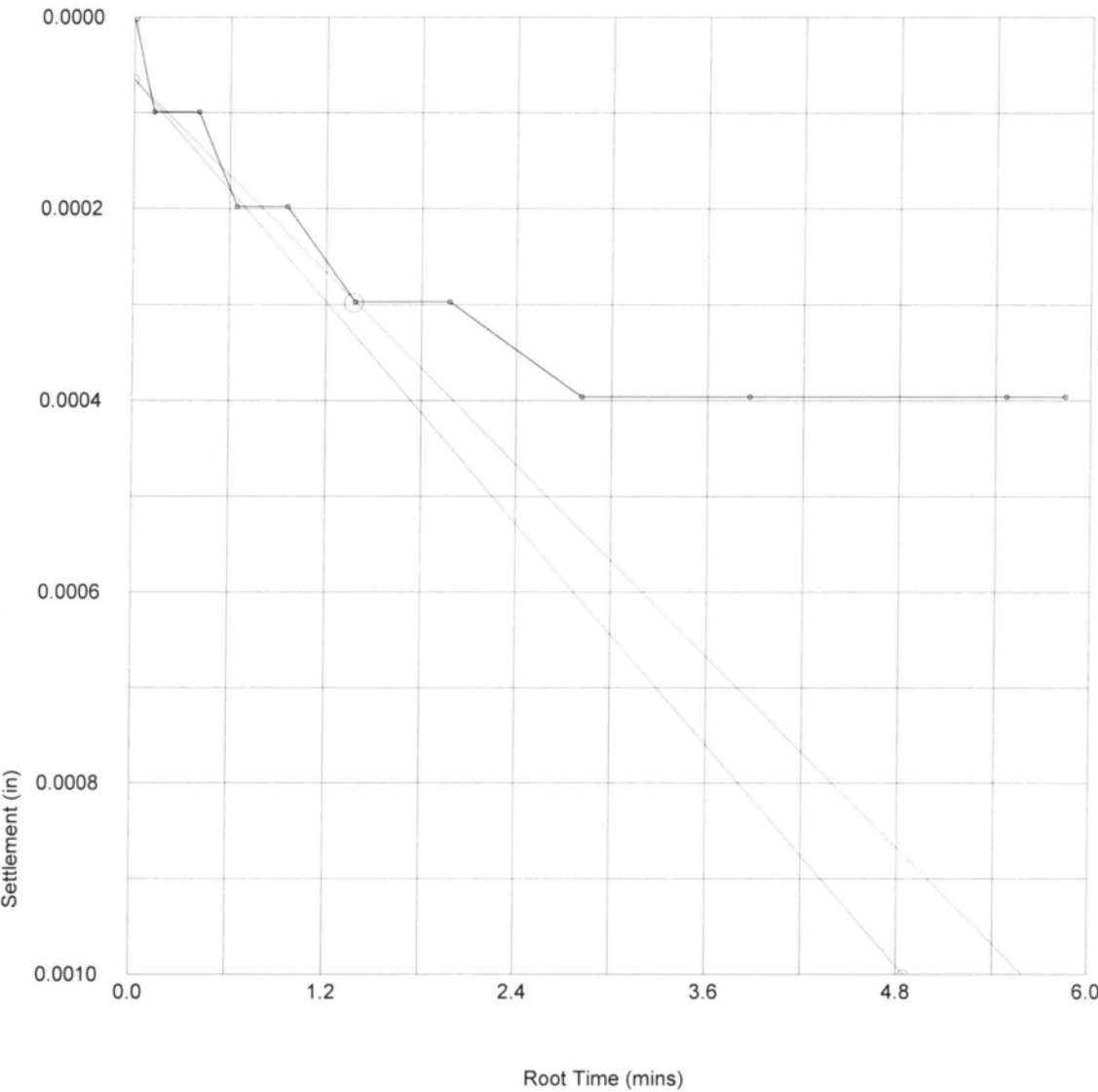
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			Date of Test: 12-1-16		
	Site Reference: C.F. Harvey		Sample: ST-7		
	Jobfile: E:\16010.JOB		Borehole: L-24600		
Operator: <i>mk</i>		Checked: <i>mk</i>		Approved:	



Oedometer Settlement Tests


Settlement Stage Results

Vertical Stress (TSF)	0.050
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0004
Voids Ratio e	0.5250
Final Temp oC	0.0
t <sub>90</sub> (mins)	1.89
c <sub>v</sub> (ft <sup>2</sup> /day)	1.119
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.008
Sec Compression C <sub>sec</sub>	0.00



Oedometer Settlement Tests

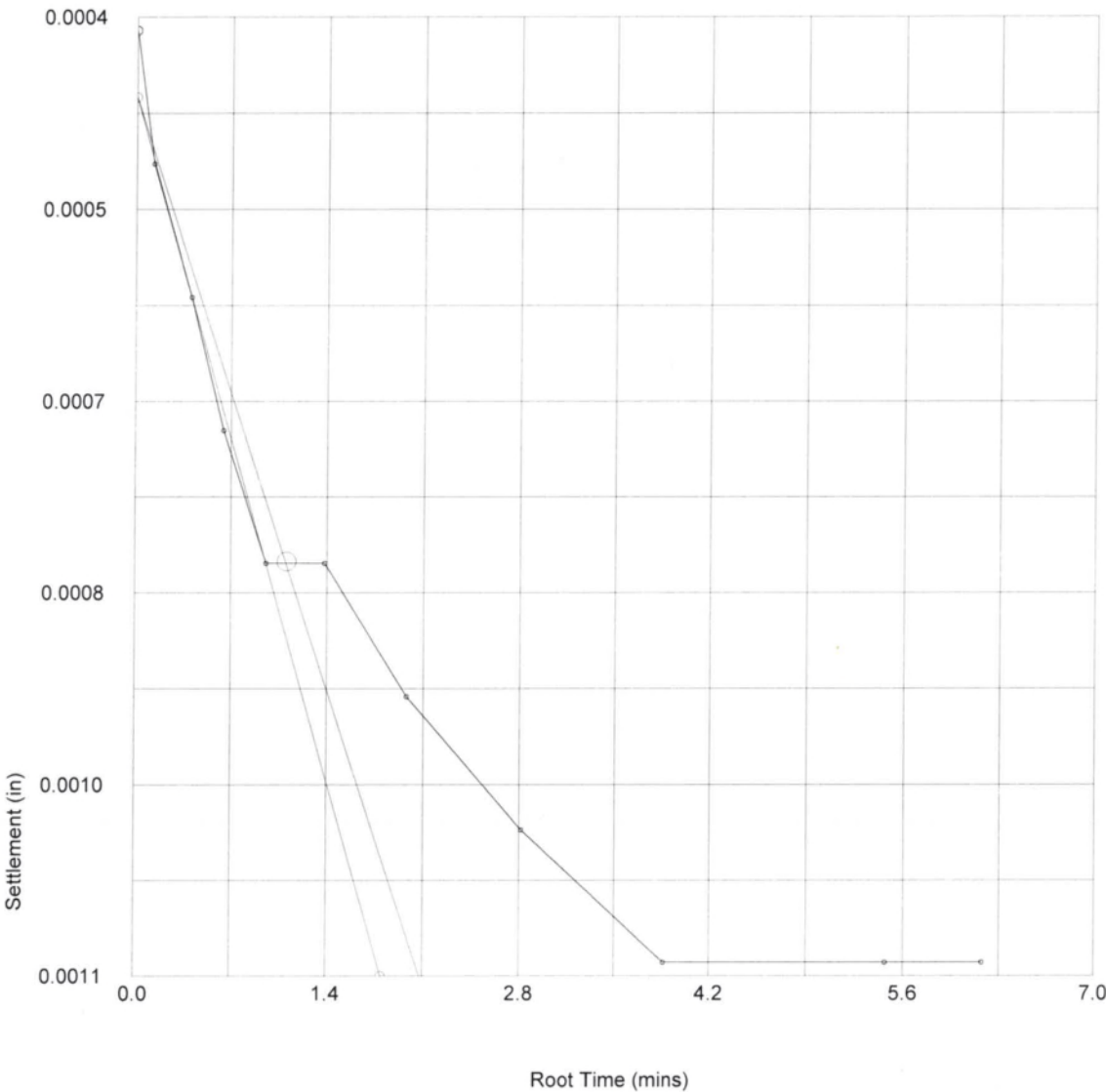
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	4	0.0004	0.0004
2	0.017	5	0.0005	0.0005
3	0.167	6	0.0006	0.0006
4	0.417	7	0.0007	0.0007
5	0.917	8	0.0008	0.0008
6	1.917	8	0.0008	0.0008
7	3.917	9	0.0009	0.0009
8	7.917	10	0.0010	0.0010
9	14.917	11	0.0011	0.0011
10	29.917	11	0.0011	0.0011
11	38.133	11	0.0011	0.0011

	ASTM D2435-96		Test name	Consolidation	Load: 0.250 (TSF)
			Date of Test:	12-1-16	
	Site Reference:	C.F. Harvey	Sample:	ST-7	
	Jobfile:	E:\16010.JOB	Borehole:	L-24600	
	Operator:	MLL	Checked:	MLL	Approved:

Oedometer Settlement Tests



Settlement Stage Results

Vertical Stress (TSF)	0.250
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0007
Voids Ratio e	0.5239
Final Temp oC	0.0
t <sub>90</sub> (mins)	1.22
c <sub>v</sub> (ft <sup>2</sup> /day)	1.728
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.004
Sec Compression C <sub>sec</sub>	0.00



Oedometer Settlement Tests

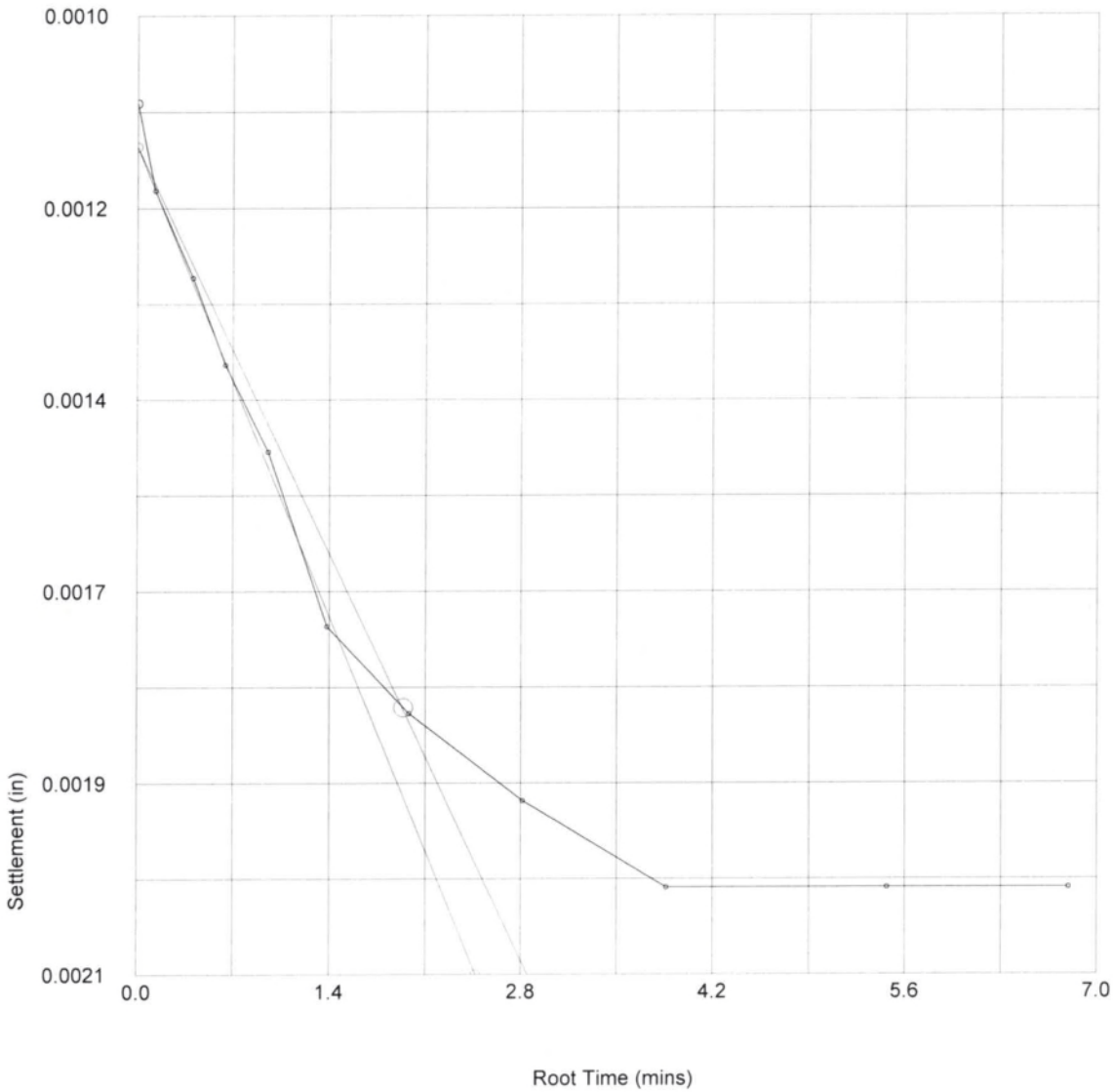
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	11	0.0011	0.0011
2	0.017	12	0.0012	0.0012
3	0.167	13	0.0013	0.0013
4	0.417	14	0.0014	0.0014
5	0.917	15	0.0015	0.0015
6	1.917	17	0.0017	0.0017
7	3.917	18	0.0018	0.0018
8	7.917	19	0.0019	0.0019
9	14.917	20	0.0020	0.0020
10	29.917	20	0.0020	0.0020
11	46.177	20	0.0020	0.0020

	ASTM D2435-96		Test name	Consolidation Load: 0.500 (TSF)
			Date of Test:	12-1-16
	Site Reference:	C.F. Harvey	Sample:	ST-7
	Jobfile:	E:\16010.JOB	Borehole:	L-24600
	Operator:		Checked:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.500
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0009
Voids Ratio e	0.5225
Final Temp oC	0.0
t <sub>90</sub> (mins)	3.73
c <sub>v</sub> (ft <sup>2</sup> /day)	0.566
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.004
Sec Compression C <sub>sec</sub>	0.00



ASTM D2435-96

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: *ML*

Checked: *ML*

Test name: Consolidation  
Date of Test: 12-1-16

Sample: ST-7  
Borehole: L-24600

Approved:

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	20	0.0020	0.0020
2	0.017	28	0.0028	0.0028
3	0.167	31	0.0031	0.0031
4	0.417	33	0.0033	0.0033
5	0.917	35	0.0035	0.0035
6	1.917	37	0.0037	0.0037
7	3.917	38	0.0038	0.0038
8	7.917	39	0.0039	0.0039
9	14.917	40	0.0040	0.0040
10	29.917	41	0.0041	0.0041
11	54.333	42	0.0042	0.0042



ASTM D2435-96

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: *ML*

Checked: *ML*

Test name: Consolidation Load: 1.000 (TSF)  
Date of Test: 12-1-16

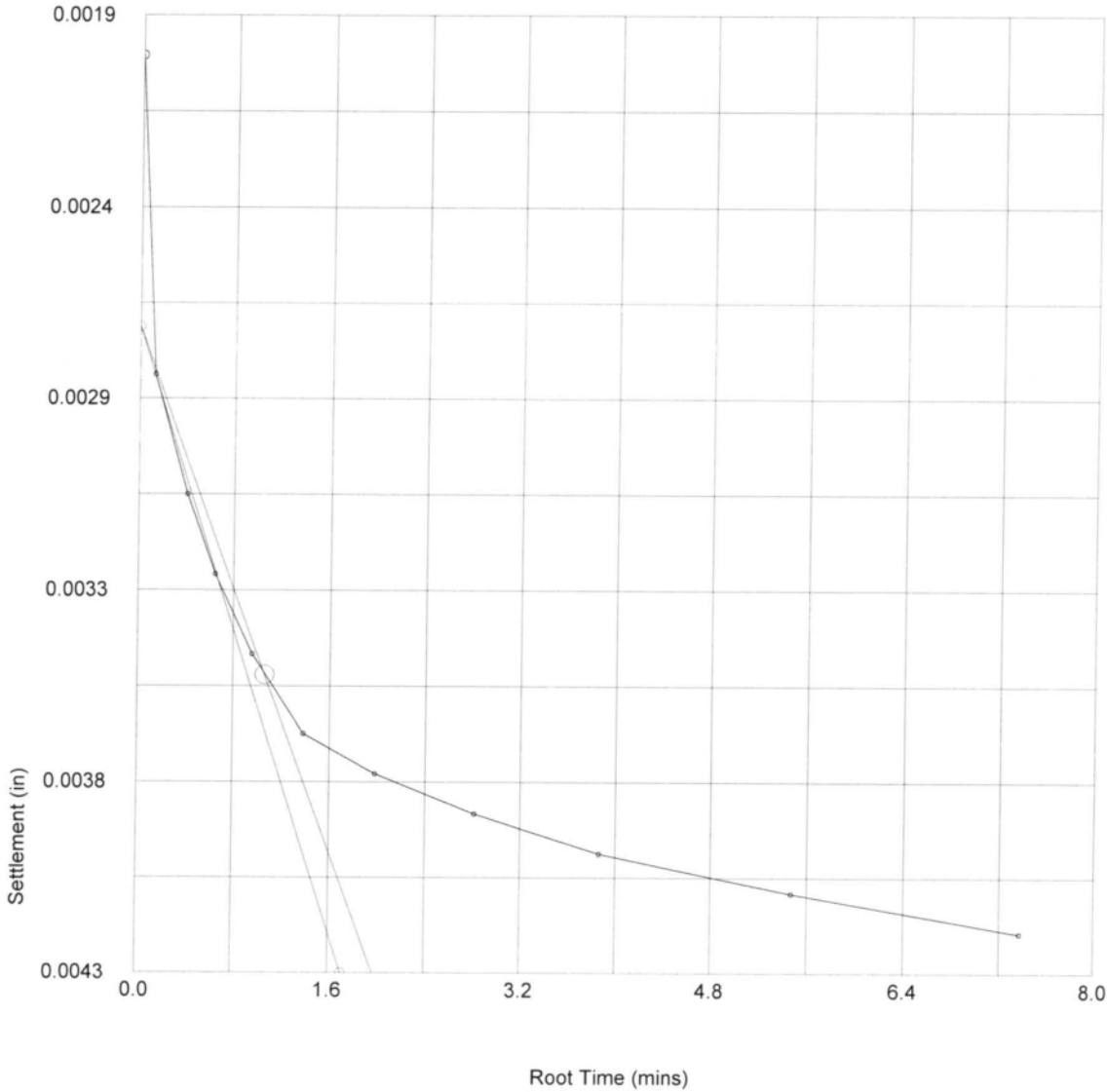
Sample: ST-7  
Borehole: L-24600

Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	1.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0022
Voids Ratio e	0.5192
Final Temp oC	0.0
t <sub>90</sub> (mins)	1.13
c <sub>v</sub> (ft <sup>2</sup> /day)	1.868
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.004
Sec Compression C <sub>sec</sub>	0.00



Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	42	0.0042	0.0042
2	0.017	55	0.0055	0.0055
3	0.167	90	0.0090	0.0090
4	0.417	94	0.0094	0.0094
5	0.917	98	0.0098	0.0098
6	1.917	101	0.0101	0.0101
7	3.917	103	0.0103	0.0103
8	7.917	105	0.0105	0.0105
9	14.917	106	0.0106	0.0106
10	30.200	107	0.0107	0.0107
11	60.200	108	0.0108	0.0108
12	78.417	108	0.0108	0.0108

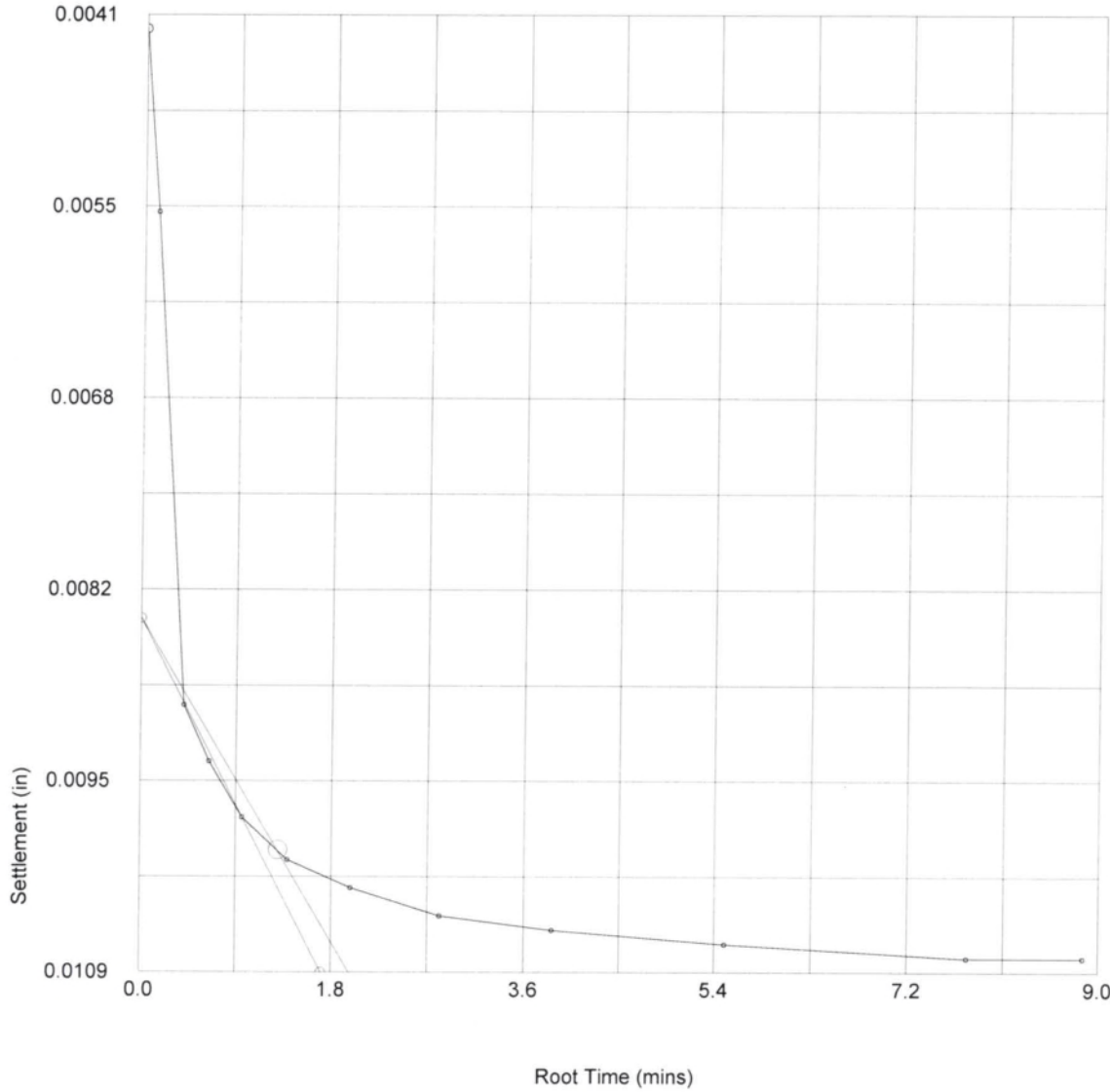
	ASTM D2435-96		Test name Consolidation Load: 2.000 (TSF)	
	Site Reference: C.F. Harvey		Date of Test: 12-1-16	
	Jobfile: E:\16010.JOB		Sample: ST-7	
	Operator: <i>MLC</i>		Borehole: L-24600	
		Checked: <i>MLC</i>	Approved:	



Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	2.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0066
Voids Ratio e	0.5091
Final Temp oC	0.0
t <sub>90</sub> (mins)	1.68
c <sub>v</sub> (ft <sup>2</sup> /day)	1.237
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.007
Sec Compression C <sub>sec</sub>	0.00



ASTM D2435-96	Test name	Consolidation
Site Reference: C.F. Harvey	Date of Test:	12-1-16
Jobfile: E:\16010.JOB	Sample:	ST-7
Operator: <i>MLC</i>	Borehole:	L-24600
Checked: <i>MLC</i>	Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	108	0.0108	0.0108
2	0.017	111	0.0111	0.0111
3	0.167	183	0.0183	0.0183
4	0.417	191	0.0191	0.0191
5	0.917	196	0.0196	0.0196
6	1.917	200	0.0200	0.0200
7	3.917	204	0.0204	0.0204
8	7.917	206	0.0206	0.0206
9	14.917	208	0.0208	0.0208
10	29.917	210	0.0210	0.0210
11	59.917	212	0.0212	0.0212
12	75.633	212	0.0212	0.0212

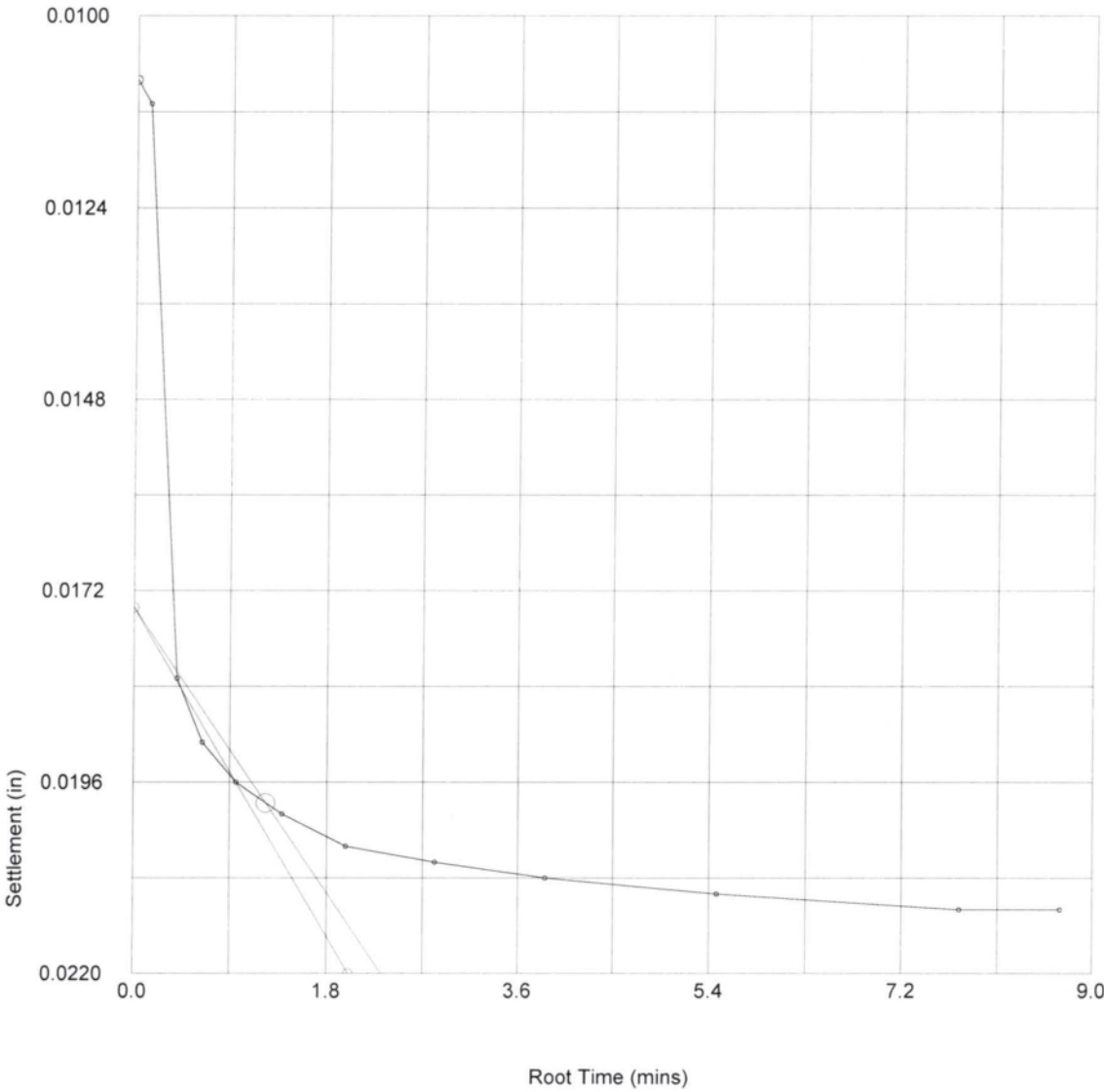


ASTM D2435-96	Test name	Consolidation Load: 4.000 (TSF)
Site Reference: C.F. Harvey	Date of Test:	12-1-16
Jobfile: E:\16010.JOB	Sample:	ST-7
Operator: <i>MLC</i>	Borehole:	L-24600
Checked: <i>MLC</i>	Approved:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	4.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0104
Voids Ratio e	0.4932
Final Temp oC	0.0
t <sub>90</sub> (mins)	1.52
c <sub>v</sub> (ft <sup>2</sup> /day)	1.347
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.005
Sec Compression C <sub>sec</sub>	0.00



ASTM D2435-96

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: *MLC*

Test name: Consolidation  
Date of Test: 12-1-16

Sample: ST-7  
Borehole: L-24600

Checked: *MLC*

Approved:

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	212	0.0212	0.0212
2	0.017	206	0.0206	0.0206
3	0.167	198	0.0198	0.0198
4	0.417	197	0.0197	0.0197
5	0.917	197	0.0197	0.0197
6	1.917	196	0.0196	0.0196
7	3.917	196	0.0196	0.0196
8	7.917	196	0.0196	0.0196
9	14.917	195	0.0195	0.0195
10	29.917	194	0.0194	0.0194
11	59.917	194	0.0194	0.0194
12	119.917	194	0.0194	0.0194



ASTM D2435-96

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: *MLC*

Test name: Consolidation Load: 2.000 (TSF)  
Date of Test: 12-1-16

Sample: ST-7  
Borehole: L-24600

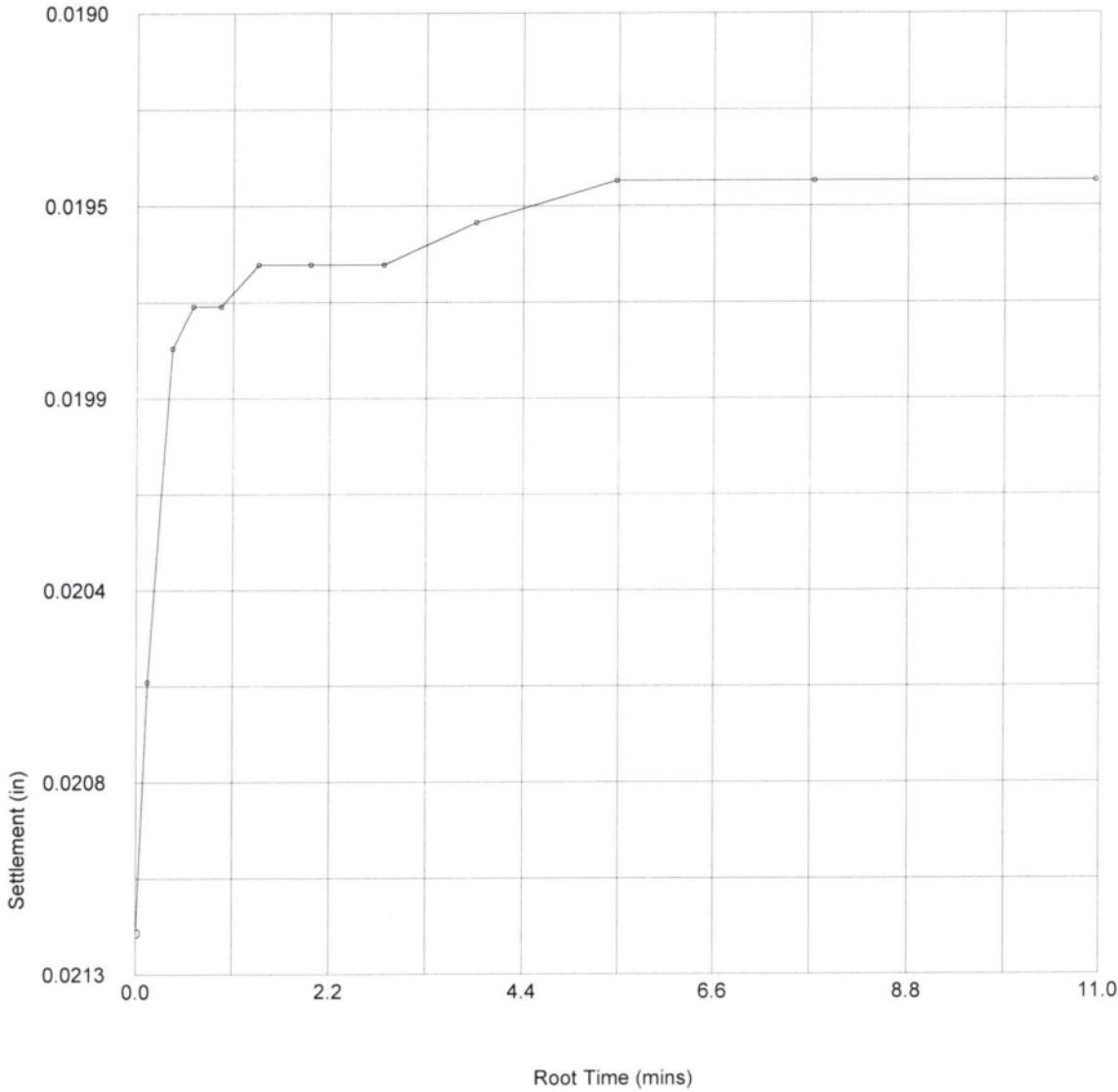
Checked: *MLC*

Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF) 2.000  
Initial Temp oC 21.6  
Correction (in) 0.0  
Settlement (in) 0.0018  
Voids Ratio e 0.4960  
  
Final Temp oC  
t<sub>90</sub> (mins)  
c<sub>v</sub> (ft<sup>2</sup>/day)  
m<sub>v</sub> (ft<sup>2</sup>/ton)  
Sec Compression C<sub>sec</sub>



Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	194	0.0194	0.0194
2	0.017	188	0.0188	0.0188
3	0.167	172	0.0172	0.0172
4	0.417	169	0.0169	0.0169
5	0.917	167	0.0167	0.0167
6	1.917	164	0.0164	0.0164
7	3.917	162	0.0162	0.0162
8	7.917	161	0.0161	0.0161
9	14.917	159	0.0159	0.0159
10	29.917	158	0.0158	0.0158
11	44.550	158	0.0158	0.0158



ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	12-1-16
Jobfile: E:\16010.JOB		Sample:	ST-7
Operator: <i>mk</i>		Borehole:	L-24600
Checked: <i>mk</i>		Approved:	

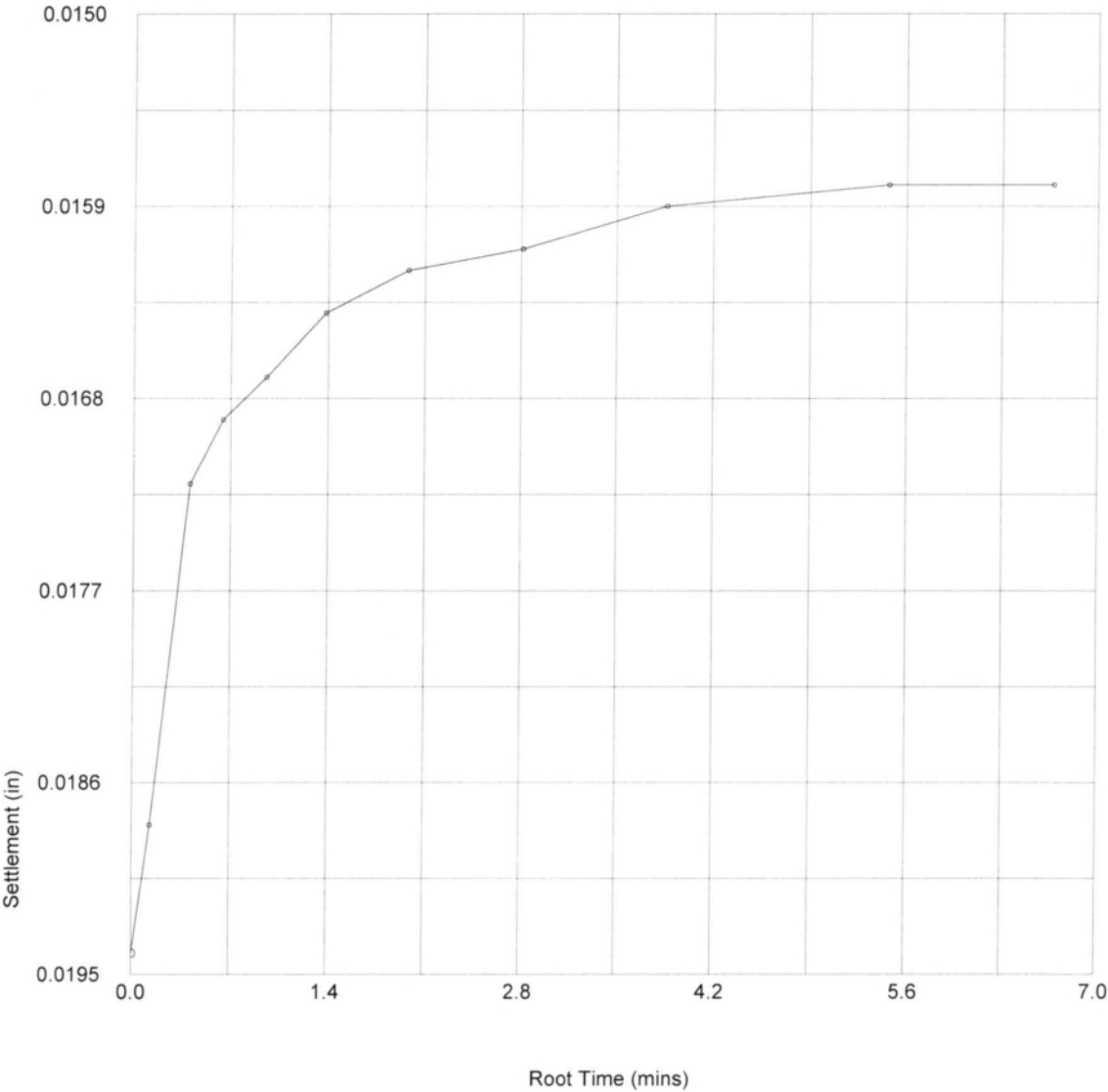


ASTM D2435-96		Test name	Consolidation Load: 0.500 (TSF)
Site Reference: C.F. Harvey		Date of Test:	12-1-16
Jobfile: E:\16010.JOB		Sample:	ST-7
Operator: <i>mk</i>		Borehole:	L-24600
Checked: <i>mk</i>		Approved:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF) 0.500  
Initial Temp oC 21.6  
Correction (in) 0.0  
Settlement (in) 0.0036  
Voids Ratio e 0.5015  
  
Final Temp oC  
t<sub>90</sub> (mins)  
c<sub>v</sub> (ft<sup>2</sup>/day)  
m<sub>v</sub> (ft<sup>2</sup>/ton)  
Sec Compression C<sub>sec</sub>



ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	12-1-16
Jobfile: E:\16010.JOB		Sample:	ST-7
Operator: <i>ML</i>		Borehole:	L-24600
Checked: <i>ML</i>		Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	158	0.0158	0.0158
2	0.017	154	0.0154	0.0154
3	0.167	142	0.0142	0.0142
4	0.417	138	0.0138	0.0138
5	0.917	134	0.0134	0.0134
6	1.917	130	0.0130	0.0130
7	3.917	125	0.0125	0.0125
8	7.917	120	0.0120	0.0120
9	14.917	116	0.0116	0.0116
10	29.917	114	0.0114	0.0114
11	59.917	113	0.0113	0.0113
12	74.113	112	0.0112	0.0112



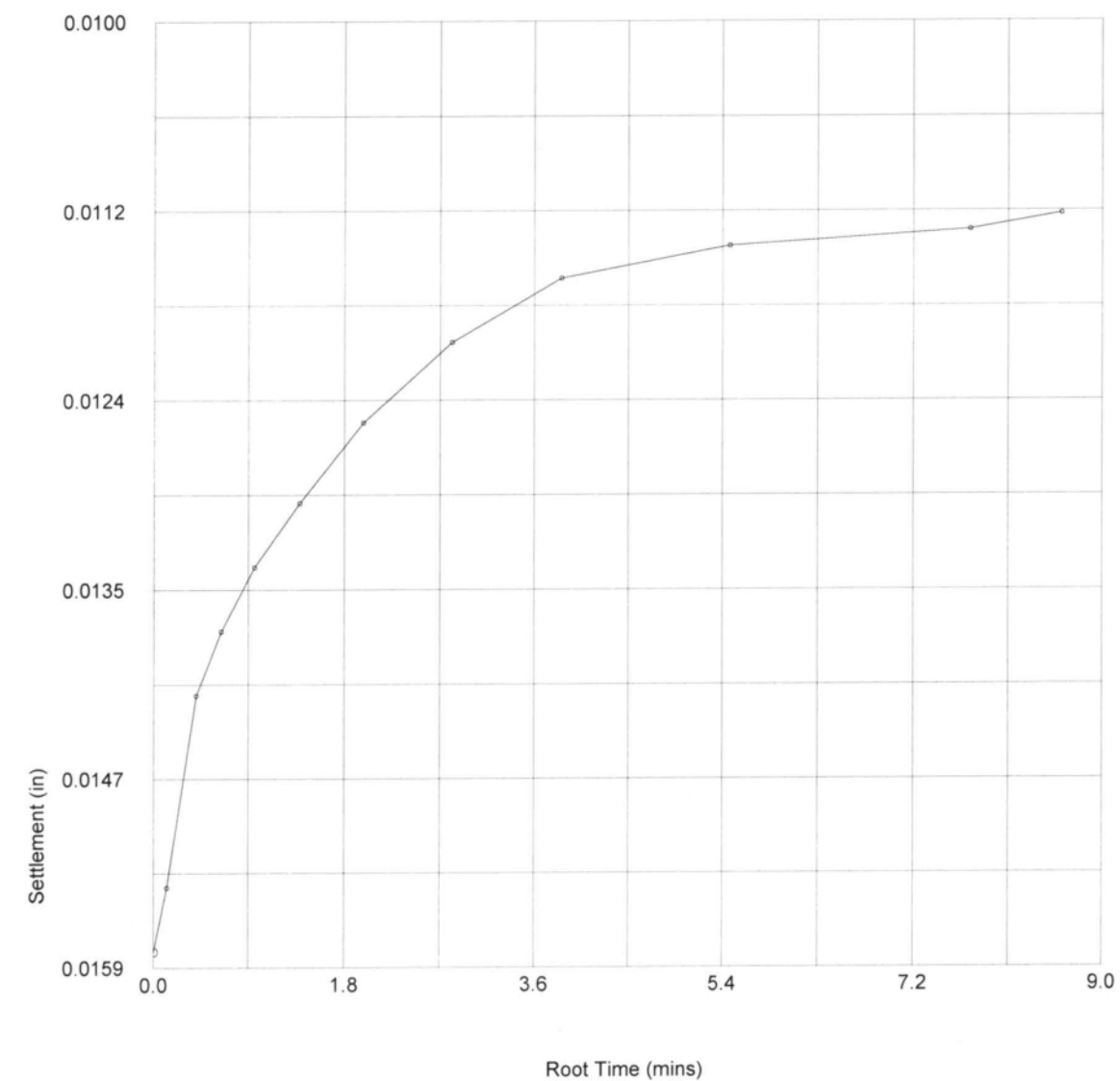
ASTM D2435-96		Test name	Consolidation Load: 0.050 (TSF)
Site Reference: C.F. Harvey		Date of Test:	12-1-16
Jobfile: E:\16010.JOB		Sample:	ST-7
Operator: <i>ML</i>		Borehole:	L-24600
Checked: <i>ML</i>		Approved:	



# Oedometer Settlement Tests

## Settlement Stage Results

Vertical Stress (TSF) 0.050  
Initial Temp oC 21.6  
Correction (in) 0.0  
Settlement (in) 0.0046  
Voids Ratio e 0.5085  
Final Temp oC  
t<sub>90</sub> (mins)  
c<sub>v</sub> (ft<sup>2</sup>/day)  
m<sub>v</sub> (ft<sup>2</sup>/ton)  
Sec Compression C<sub>sec</sub>



	ASTM D2435-96		Test name	Consolidation
	Site Reference: C.F. Harvey		Date of Test:	12-1-16
	Jobfile: E:\16010.JOB		Sample:	ST-7
	Operator: <i>MLC</i>		Borehole:	L-24600
Checked: <i>MLC</i>		Approved:		

Form No. TR-T88

Revision No. 0

Revision Date: 12/20/09

## Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT

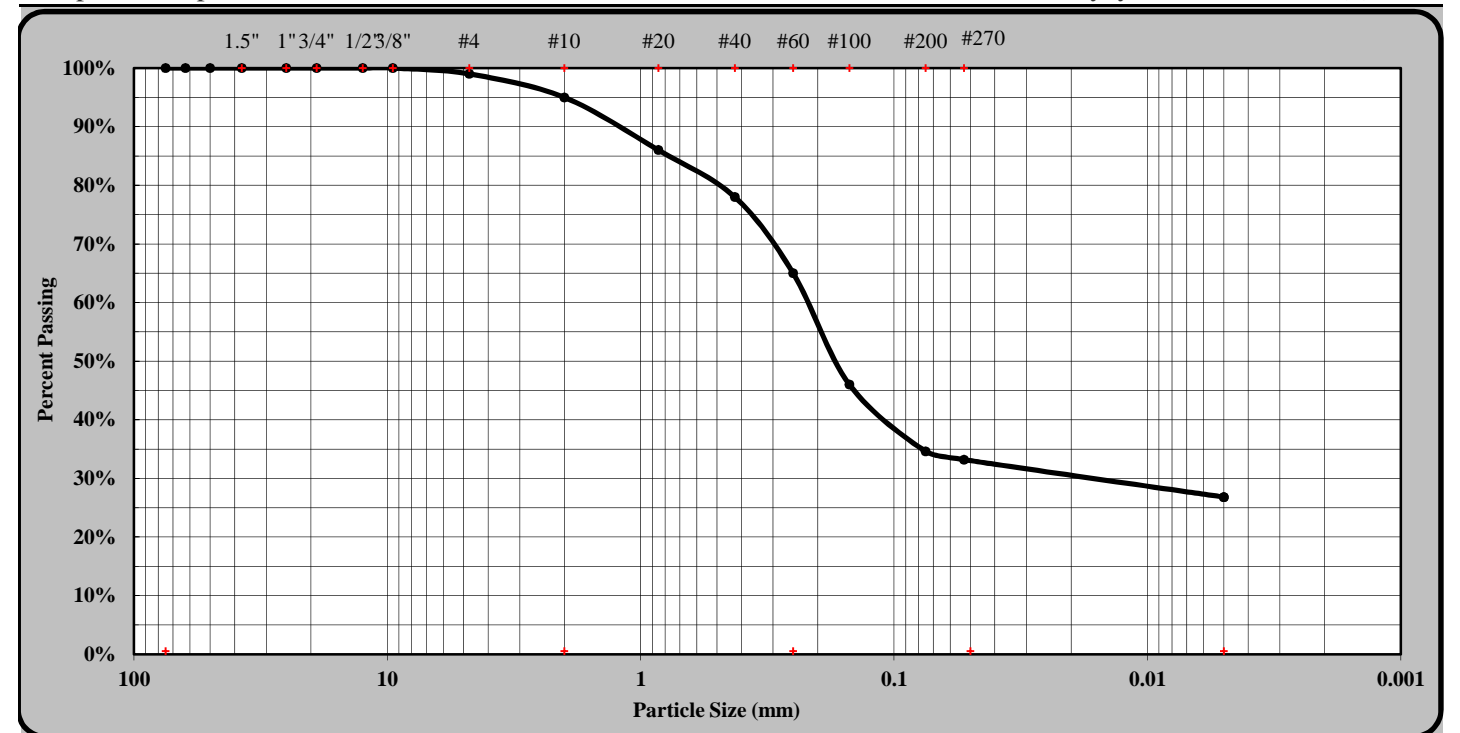


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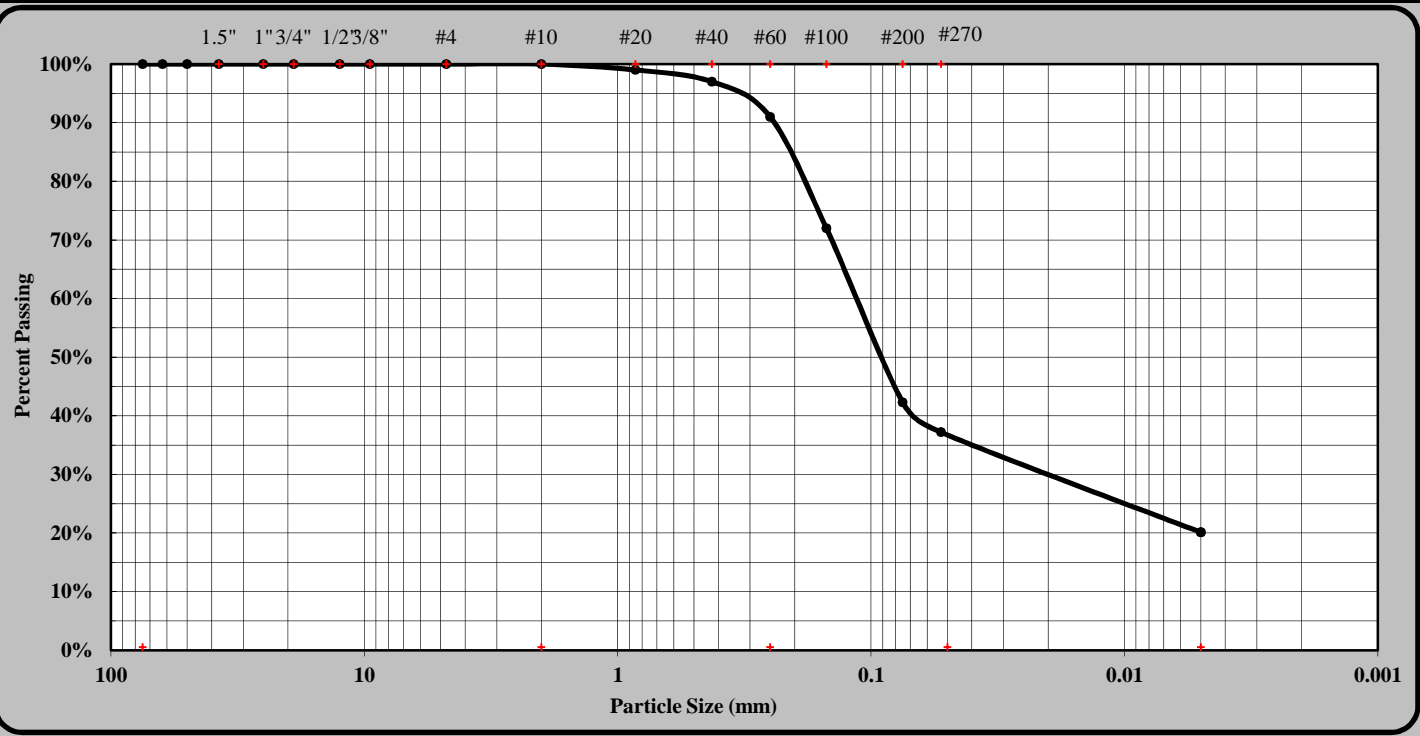
Quality Assurance

**S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616**

S&ME Project #:	6235-16-010	Report Date:	11/8/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/1-8/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-24900	Sample #:	SS-55
Location:	249+00	Sample Date:	9/16/16
		Offset:	CL
		Depth (ft):	2.0-3.5'
Sample Description:	Clayey SAND A-2-7 (3)		



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/8/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/1-8/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-25800	Sample #:	SS-56
Location:	258+00	Offset:	75' LT
Sample Description:	Sandy SILT A-4 (0)		

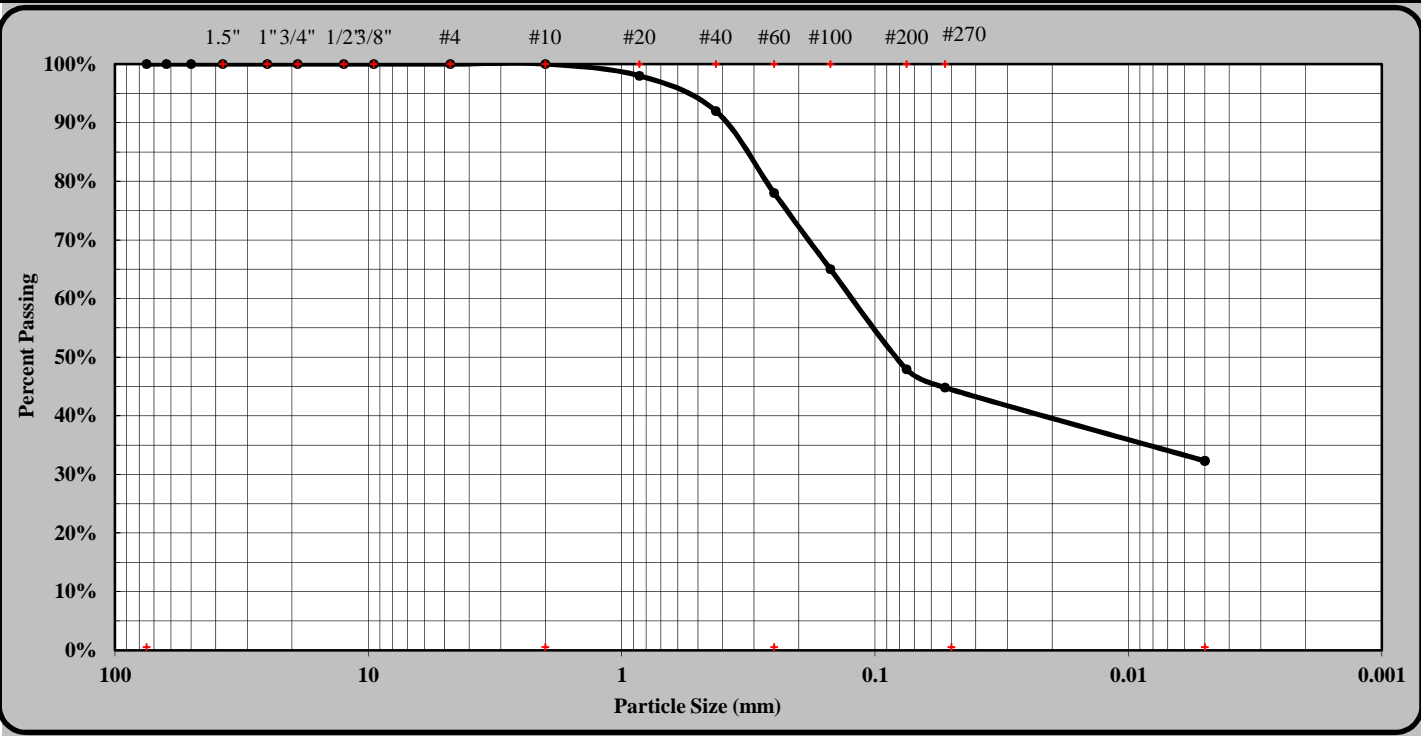


As Defined by NCDOT			Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm		Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm		Clay		< 0.005 mm	
Maximum Particle Size	#20	Coarse Sand	9%	Silt	17%	
Gravel	0%	Fine Sand	54%	Clay	20%	
Apparent Relative Density	2.650	Moisture Content	17.3%	% Passing #200	42.3%	
Liquid Limit	18	Plastic Limit	13	Plastic Index	5	
Soil Mortar (-#10 Sieve)						
Coarse Sand	9%	Fine Sand	54%	Silt	17%	Clay 20%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular		<input checked="" type="checkbox"/>
Hard & Durable		<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable <input type="checkbox"/>	

References / Comments / Deviations: ND=Not Determined.

<u>Karen Warner</u> Technician Name	<u>118-06-0305</u> Certification No.	<u>Laboratory Technician</u> Position	<u>11/8/2016</u> Date
<u>Stewart Laney, P.E</u> Technical Responsibility	_____ Signature	<u>Senior Engineer</u> Position	_____ Date
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/8/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/1-8/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-26400	Sample #:	SS-57
Location:	264+00	Offset:	CL
Sample Description:	Sandy CLAY A-6 (2)		



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#10	Coarse Sand	22%	Silt	13%
Gravel	0%	Fine Sand	33%	Clay	32%
Apparent Relative Density	2.650	Moisture Content	20.7%	% Passing #200	47.9%
Liquid Limit	26	Plastic Limit	14	Plastic Index	12
Soil Mortar (-#10 Sieve)					
Coarse Sand	22%	Fine Sand	33%	Silt	13%
				Clay	32%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

<u>Karen Warner</u> Technician Name	<u>118-06-0305</u> Certification No.	<u>Laboratory Technician</u> Position	<u>11/8/2016</u> Date
<u>Stewart Laney, P.E</u> Technical Responsibility	_____ Signature	<u>Senior Engineer</u> Position	_____ Date
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Form No. TR-T88  
Revision No. 0  
Revision Date: 12/20/09

Particle Size Analysis of Soils  
AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 11/14/16

Project Name: C.F. Harvey Parkway Extension R-5703Test Date(s): 10/7 - 11/14/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

Client Name: Michael Baker Engineering

Address: Raleigh, NC

Boring #: L-27598Sample #: CBR-5Sample Date: 9/14/16

Location: 275+98Offset: 3' RTDepth (ft): 1.0 - 3.0

Sample Description: Tan-Brown Coarse to Fine Sandy Silty CLAY A-6 (4)

100%

90%

80%

70%

60%

50%

40%

30%

20%

10%

0%

1.5"1"3/4"1/23/8"#4#10#20#40#60#100#200#270

100

10

1

0.1

0.01

0.001

Percent Passing

Particle Size (mm)

As Defined by NCDOT

Gravel< 75 mm and > 2.00 mm

Fine Sand< 0.25 mm and > 0.05 mm

Coarse Sand< 2.00 mm and >0.25 mm

Silt< 0.05 and > 0.005 mm

Clay< 0.005 mm

Maximum Particle Size#10Coarse Sand10%Silt21%

Gravel0%Fine Sand39%Clay30%

Apparent Relative DensityNDMoisture Content17.5%

% Passing #20054.5%

Liquid Limit28Plastic Limit14Plastic Index14

Soil Mortar (-#10 Sieve)

Coarse Sand10%

Fine Sand39%

Silt21%

Clay30%

Description of Sand & Gravel Particles:

Rounded☐

Angular☐

Hard & Durable☐Soft☐Weathered & Friable☐

References / Comments / Deviations:ND=Not Determined.

Mal Krajan, ET

104-01-0703

Laboratory Manager

11/14/2016

Technician Name

Certification No.

Position

Date

Mal Krajan, ET

Laboratory Manager

11/14/2016

Technical Responsibility

Signature

Position

Date

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S&ME, Inc.

3201 Spring Forest Road  
Raleigh, NC 27616

42a.L-27598 Bulk S-58 (1 - 3 ft) Classification.xls

Form No. TR-D698-2  
Revision No. : 0  
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 10/10/16

Project Name: C.F. Harvey Parkway Extension R-5703Test Date(s): 10/5 - 10/10/16

Client Name: Michael Baker

Client Address: Cary, NC

Boring #: L-27598Sample #: CBR-5Sample Date: 9/14/2016

Location: 275+98Offset: 3' RTDepth: 1.0 - 3.0 ft

Sample Description: Tan-Brown Coarse to Fine Sandy Silty CLAY (A-6) (4)

Maximum Dry Density118.1 PCF.Optimum Moisture Content12.8%

AASHTO T99 - - Method A

Moisture-Density Relations of Soil and Soil-Aggregate Mixtures

130.0

125.0

120.0

115.0

110.0

105.0

100.0

0.0

5.0

10.0

15.0

20.0

25.0

Dry Density (PCF)

Moisture Content (%)

2.650

100% Saturation Curve

Natural Moisture Content17.5%

Assumed Specific Gravity2.650

Liquid Limit28

Plastic Limit14

Plastic Index14

% Passing

3/4"100.0%

3/8"100.0%

#4100.0%

#10100.0%

#4099.0%

#6090.0%

#20054.5%

Overdose Fraction

Bulk Gravity

% Moisture

% Overdose

MDD

Opt. MC

Moisture-Density Curve Displayed:Fine Fraction☒Corrected for Overdose Fraction (ASTM D 4718)☐

Sieve Size used to separate the Overdose Fraction:#4 Sieve☒3/8 inch Sieve☐3/4 inch Sieve☐

Mechanical Rammer☐Manual Rammer☒Moist Preparation☐Dry Preparation☒

References / Comments / Deviations:ND=Not Determined.

ASTM D 422: Particle Size Analysis of Soils

ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Mal Krajan, ET

Laboratory Manager

Technical Responsibility

Signature

Position

Date

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S&ME, Inc. - Corporate

3201 Spring Forest Road  
Raleigh, NC. 27616

42b.L-27598 Bulk S-58 (1 - 3 ft) Proctor.xls  
Page 3 of 3

CBR (California Bearing Ratio) of Laboratory  
Compacted Soil

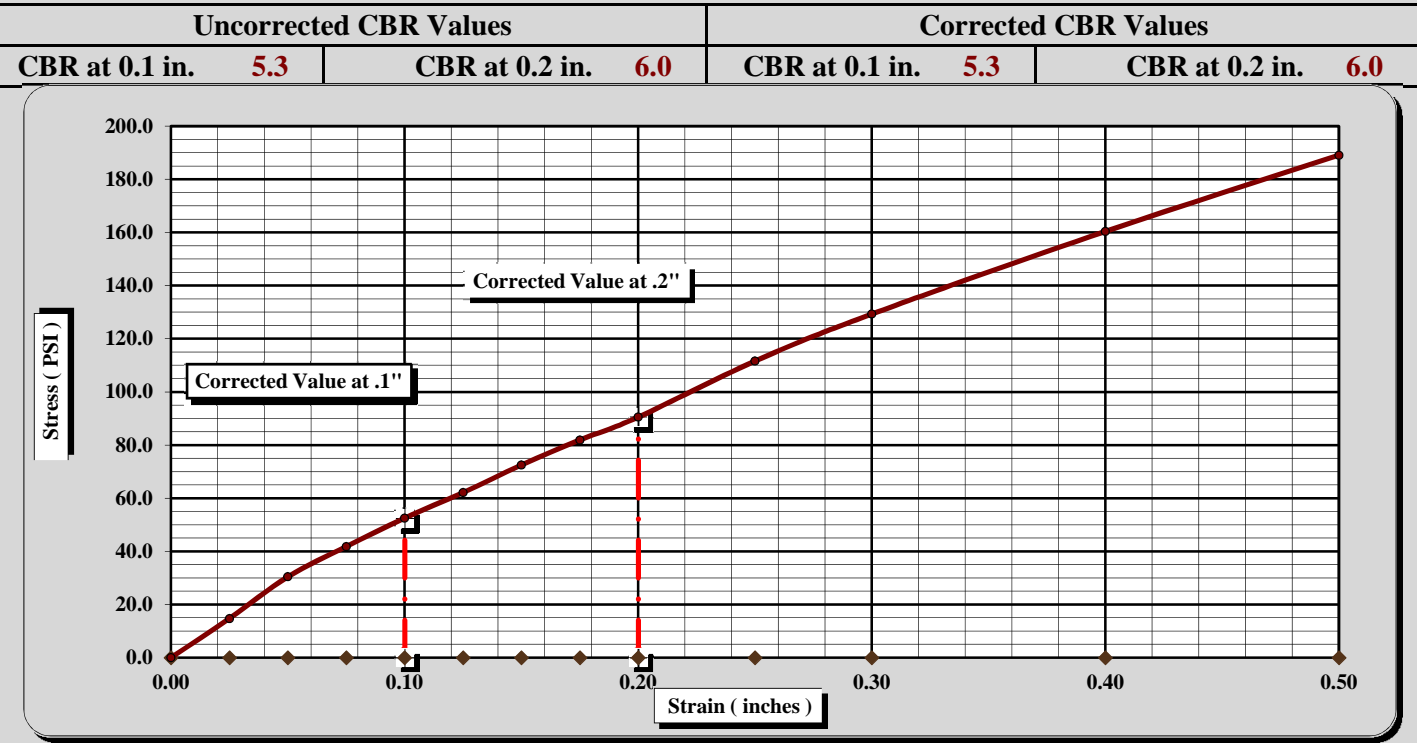
AASHTO T 193

Quality Assurance



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
Project #:	6235-16-010	Report Date:	10/17/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s)	10/7 - 10/17/16
Client Name:	Michael Baker		
Client Address:	Cary, NC		
Boring #:	L-27598	Sample #:	CBR-5
Location:	275+98	Offset:	3' RT
		Sample Date:	9/14/16
		Depth (ft):	1.0 - 3.0 ft
Sample Description: Tan-Brown Coarse to Fine Sandy Silty CLAY (A-6) (4)			

AASHTO T99	Method A	Maximum Dry Density:	118.1 PCF	Optimum Moisture Content:	12.8%
Compaction Test performed on grading complying with CBR spec.				% Retained on the 3/4" sieve:	0.0%



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	65	Final Dry Density (PCF)	117.9
Initial Dry Density (PCF)	118.8	Average Final Moisture Content	13.1%
Moisture Content of the Compacted Specimen	12.7%	Moisture Content (top 1" after soaking)	13.4%
Percent Compaction	100.6%	Percent Swell	0.3%
Soak Time:	96-hr	Surcharge Weight	10.0
		Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	28	Plastic Index	14

Notes/Deviations/References:

Test specimen was compacted to 100% at optimum moisture content.

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

10/15/2016

Date

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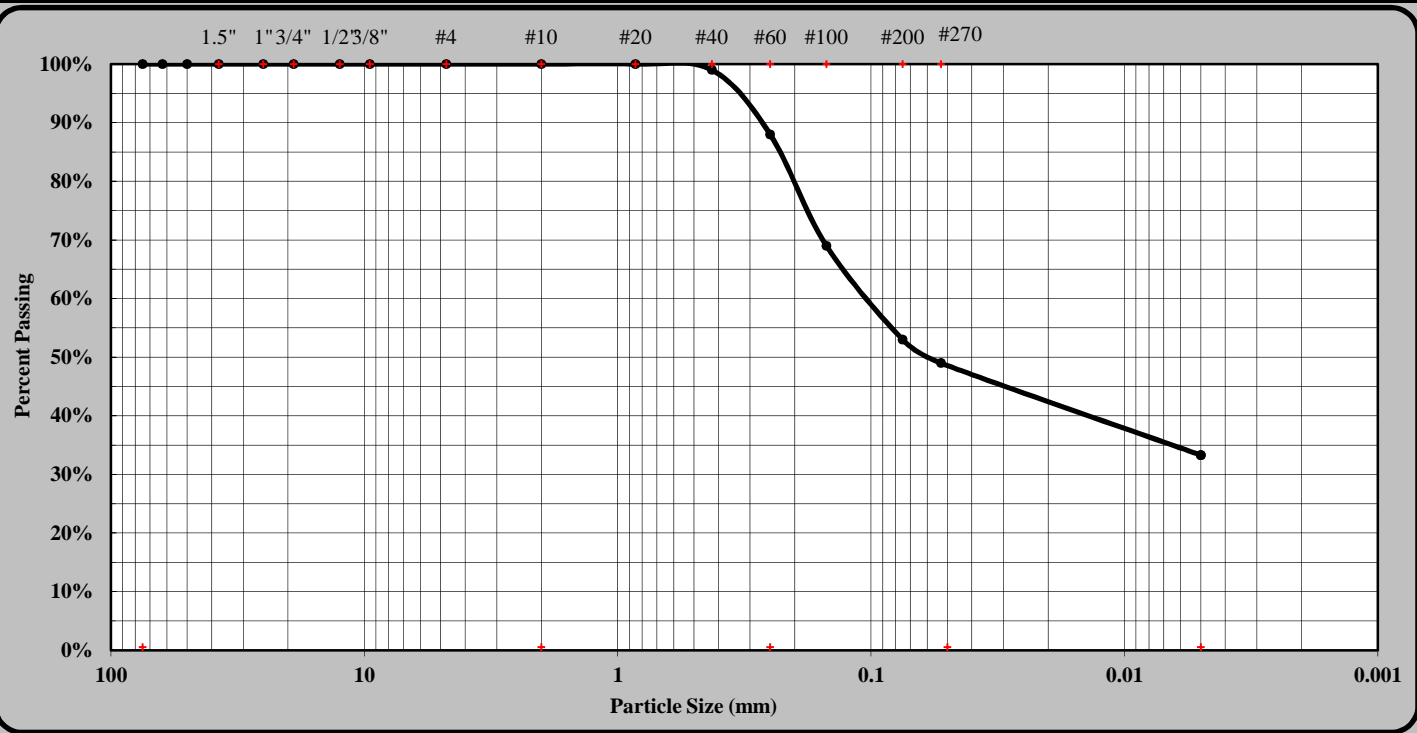
Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/3/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/15/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-27598	Sample #:	SS-59
Location:	275+98	Offset:	1' LT
		Sample Date:	9/14/16
		Depth (ft):	2.5 - 4.0
Sample Description:		Tan Coarse to Fine Sandy Silty CLAY A-7-6 (8)	



As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm
Coarse Sand	< 2.00 mm and > 0.25 mm	Clay	< 0.005 mm

Maximum Particle Size	#10	Coarse Sand	12%	Silt	16%
Gravel	0%	Fine Sand	39%	Clay	33%
Apparent Relative Density	ND	Moisture Content	20.7%	% Passing #200	53.0%
Liquid Limit	43	Plastic Limit	21	Plastic Index	22

Soil Mortar (-#10 Sieve)					
Coarse Sand	12%	Fine Sand	39%	Silt	16%
				Clay	33%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>
Hard & Durable		Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

Position

11/3/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

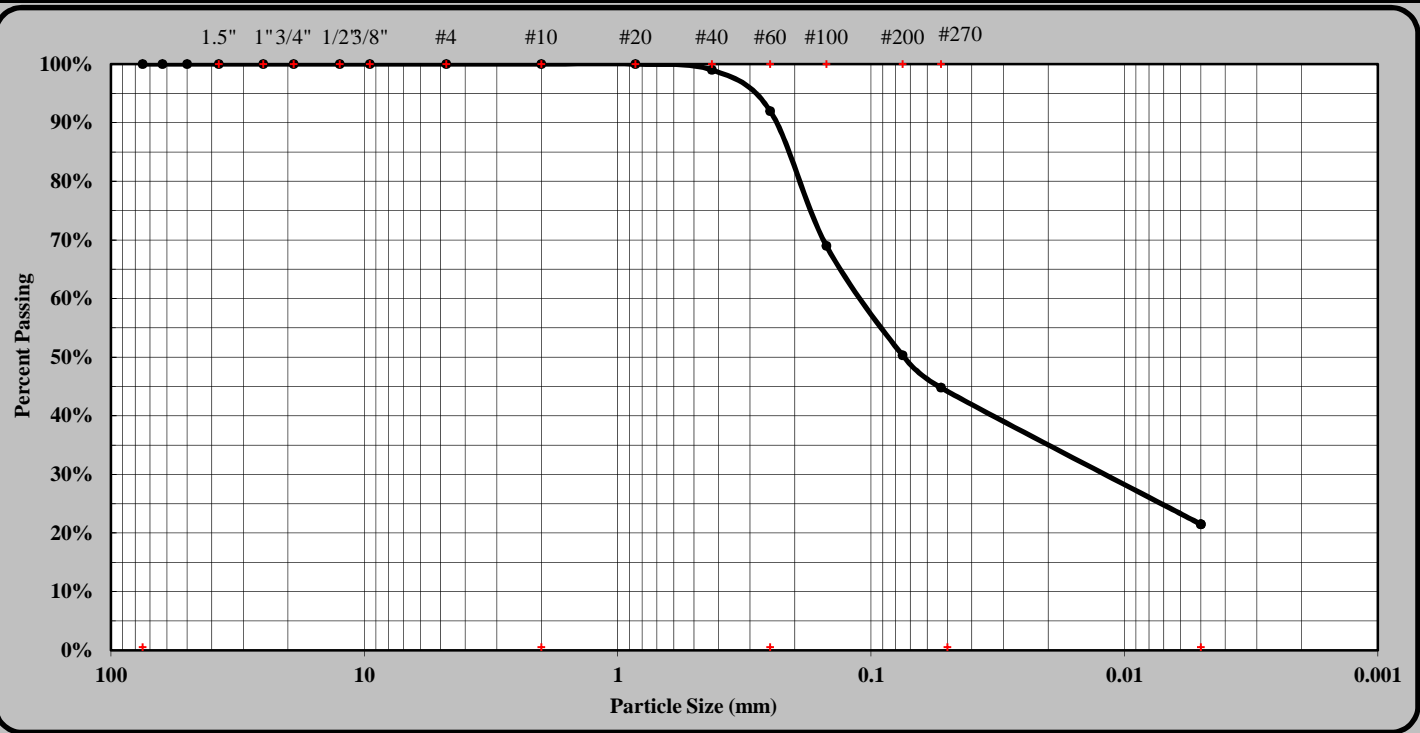
9/26/2016

Date

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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/14/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/14/16
State Project #:	46375.1.1	F.A. Project No:	N/A
		TIP NO:	R-5703
Client Name:	Michael Baker Engineering		
Address:	Raleigh, NC		
Boring #:	L-RT-28075	Sample #:	SS-65
		Sample Date:	9/13/16
Location:	280+75	Offset:	43' RT
		Depth (ft):	0.5 - 2.0
Sample Description:	Tan Coarse to Fine Sandy Clayey SILT A-4 (2)		



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#10	Coarse Sand	8%	Silt	23%
Gravel	0%	Fine Sand	47%	Clay	22%
Apparent Relative Density	ND	Moisture Content	15.8%	% Passing #200	50.3%
Liquid Limit	22	Plastic Limit	12	Plastic Index	10
Soil Mortar (-#10 Sieve)					
Coarse Sand	8%	Fine Sand	47%	Silt	23%
				Clay	22%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>		Angular	<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager


Position

11/14/2016

Date

Mal Krajan, ET

Technical Responsibility



Signature

Laboratory Manager

Position

11/14/2016

Date

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S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616			
Project #:	6235-16-010	Report Date:	10/21/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/18 - 10/21/16
Client Name:	Michael Baker Engineering		
Client Address:	Raleigh, NC		
Boring #:	L-RT-28075	Sample #:	SS-65
		Sample Date:	9/13/16
Location:	280+75	Offset:	43' RT
		Depth (ft):	0.5 - 2.0
Sample Description:	Tan Coarse to Fine Sandy Clayey SILT (A-4) (2)		

Equipment: Balance: 0.01 g. Readability, 500g. Minimum Capaccity

Balance: S&ME ID #: 1024 Cal. Date: 11/06/16 Due: 11/06/17

Method A: Moisture Content Determination Required Oven Temperature: 105 ± 5 ° C

Oven Temperature: 105 °C		Tare #	p
t	Tare Weight (Dish plus Aluminum Foil Cover)	grams	45.69
a	Mass of As-Received Specimen + Tare Wt.	grams	92.40
b	Mass of Oven Dry Specimen + Tare Wt.	grams	86.03
w	Water Weight	(a-b)	6.37
A	Mass of As-Received Specimen	(a-t)	46.71
B	Mass of Oven Dry Specimen	(b-t)	40.34
% Moisture Content as a % of As Received or Total Mass		(w/A)*100	13.6%
% Moisture Content as a % of Oven-dried Mass		(w/B)*100	15.8%

Oven S&ME ID #: 1454 Cal. Date: 10/7/16 Due: 10/7/17

Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination


Muffle Furnace: 455 °C		Tare #	104
t	Tare Weight (Dish plus Aluminum Foil Cover)	grams	50.17
b	Mass of Oven Dry Specimen + Tare Wt.	grams	86.05
c	Ash Weight + Tare Wt.	grams	85.56
C	Ash Weight	c-t	35.39
B	Mass of Oven Dry Specimen	(b-t)	35.88
D	% Ash Content	(C/B)*100	98.6%
	% Organic Matter	100-D	1.4%

Muffle Furnace: S&ME ID #: 00261

Notes / Deviations / References:

Mal Krajan, ET

Technical Responsibility



Signature

Laboratory Manager

Position

11/14/2016

Date

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pH of Soil

AASHTO T289

Quality Assurance



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616					
Project #:	6235-16-010	Report Date:	11/7/16		
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/5 - 11/7/16		
Client Name:	Michael Baker Engineering				
Client Address:	Raleigh, NC				
Boring #:	L-RT-28075	Sample #:	SS-65	Sample Date:	9/13/16
Location:	280+75	Offset:	43' RT	Depth (ft):	0.5 - 2.0
Sample Description: Tan Coarse to Fine Sandy Clayey SILT (A-4) (2)					
Equipment:					
Balance		S&ME ID#	1024	Cal. Date:	11/6/16
Sieve:	#10	S&ME ID#	13223	Cal. Date:	6/11/16
pH Meter:		S&ME ID#	1365	Cal. Date:	11/7/16

pH Meter Calibration

Buffer Solution	Results
pH buffer 7.0	7.02
pH buffer 4.01	4.01
pH buffer 10.0	10.03
Buffer Temperature °C	22.4

Measuring pH of Soil

Measurements	
Weightt of Air Dry Soil (g)	30.02
Distilled Water (g)	30.01
Temperature °C	22.4
pH Readings	5.61

Notes / Deviations / References: AASHTO T-289: Determining pH of Soil for Use in Corrosion Testing

Mal Krajan, ET

Signature

Laboratory Manager

11/14/2016

Technical Responsibility

Position

Date

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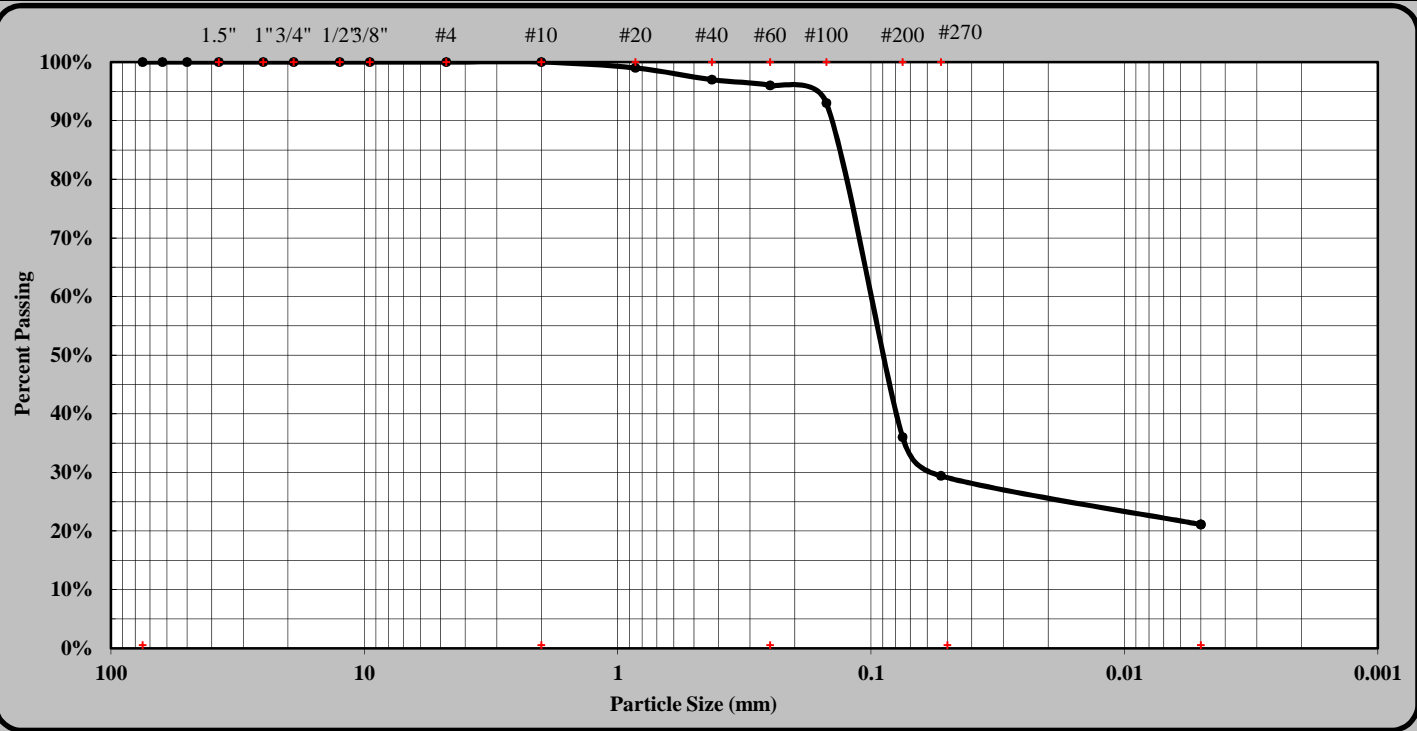
Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	12/27/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	12/24 - 12/27/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-RT-28075	Sample #:	ST-8
Location:	280+75	Offset:	43' RT
Sample Description:	Dark Gray Coarse to Fine Sandy Silty CLAY A-6 (0)		



As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm	
Maximum Particle Size	#4	Coarse Sand	4%	Silt
Gravel	0%	Fine Sand	67%	Clay
Apparent Relative Density	ND	Moisture Content	36.7%	% Passing #200
Liquid Limit	37	Plastic Limit	26	Plastic Index
Soil Mortar (-#10 Sieve)				
Coarse Sand	4%	Fine Sand	67%	Silt
Description of Sand & Gravel Particles:	Rounded			Angular
Hard & Durable	<input checked="" type="checkbox"/>	Soft		Weathered & Friable

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET

Signature

Laboratory Manager

12/27/2016

Technical Responsibility

Position

Date

104-01-0703

Signature

Laboratory Manager

9/26/2016

Certification No.

Position

Date

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## Oedometer Settlement Tests

### Sample details

Sketch showing specimen location in original Sample



Depth 15.0 - 17.0 ft.  
Description: Dark Gray Coarse to Fine Sandy Silty CLAY (A-6) (0)

Type Undisturbed  
Height  $H_0$  (in) 0.998  
Diameter  $D_0$  (in) 2.501  
Weight  $W_0$  (gr) 146.57  
Bulk Density  $\rho$  (PCF) 113.89  
Particle Density  $\rho_s$  2.661 (measured)

### Initial Conditions

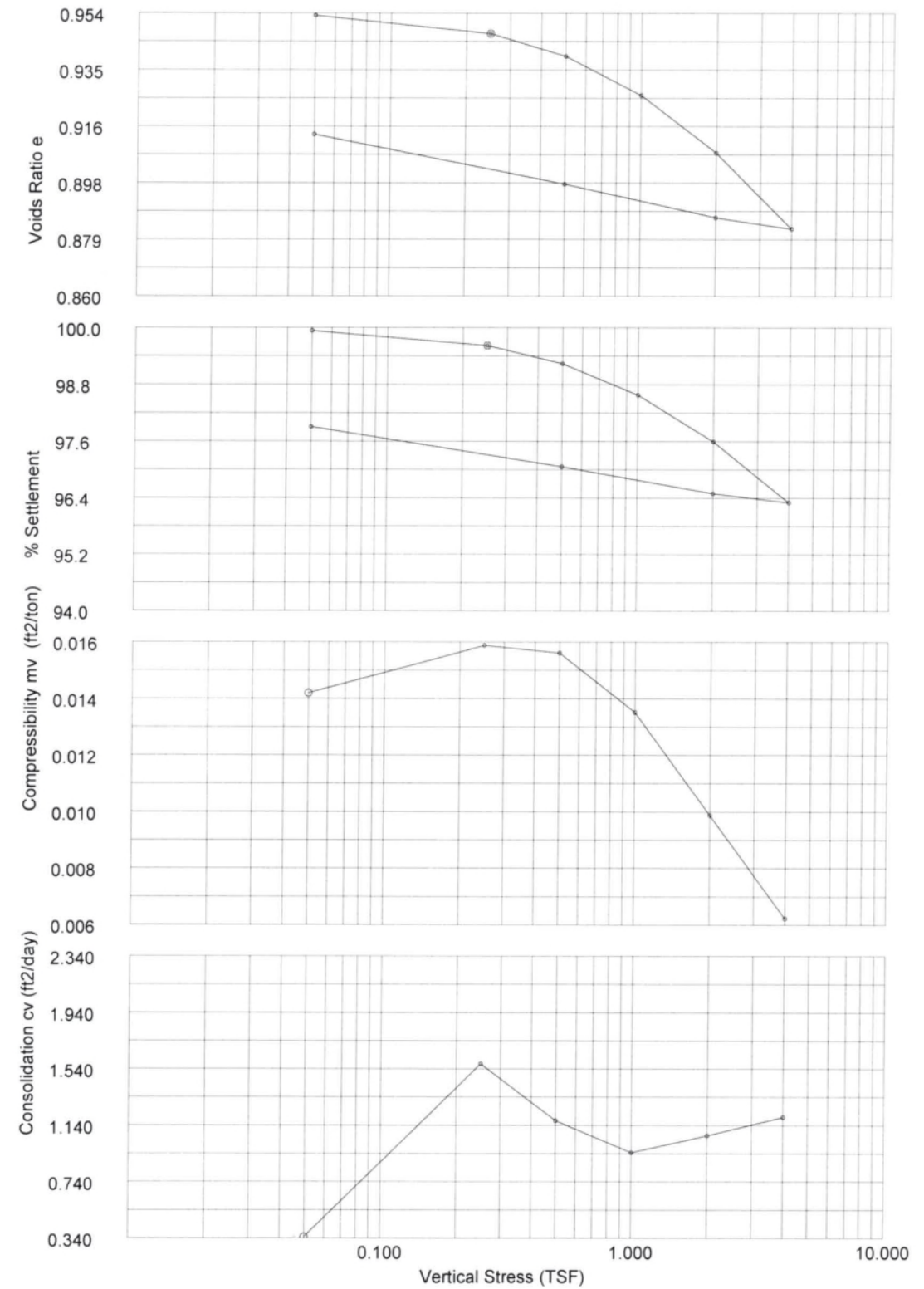
Settlement Channel 1001  
Moisture Content  $w_0$ % 34.1  
Dry Density  $\rho_d$  (PCF) 84.95  
Voids Ratio  $e_0$  0.9546  
Deg of Saturation  $S_0$ % 94.9  
Swelling Pressure  $S_s$  (TSF) 0.000

### Final Conditions

Moisture Content  $w_f$ % 33.4  
Dry Density  $\rho_d$  (PCF) 86.77  
Voids Ratio  $e_f$  0.9137  
Deg of Saturation  $S_f$ % 97.16  
Settlement: (in) 0.021  
Compression Index  $C_c$  0.085

Notes: Test specimen taken from the middle portion of UD tube.

## Oedometer Settlement Tests



ASTM D2435-96

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: *mk*Checked: *mk*

Test name Consolidation  
Date of Test: 12-7-16

Sample: ST-8  
Borehole: L-RT-28075

Approved:



ASTM D2435-96

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: *mk*Checked: *mk*

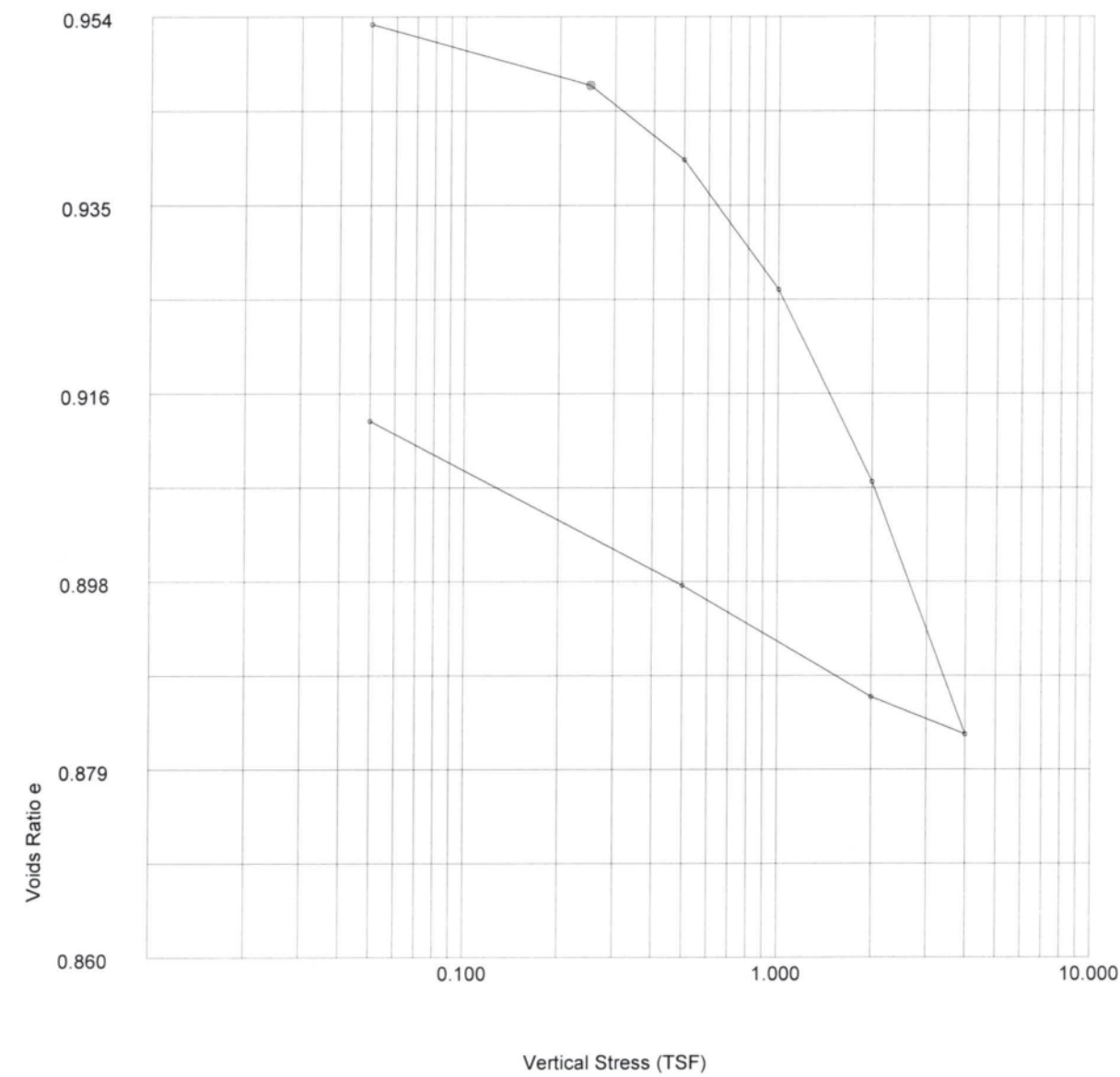
Test name Consolidation  
Date of Test: 12-7-16

Sample: ST-8  
Borehole: L-RT-28075

Approved:



Oedometer Settlement Tests



ASTM D2435-96

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: *mk*

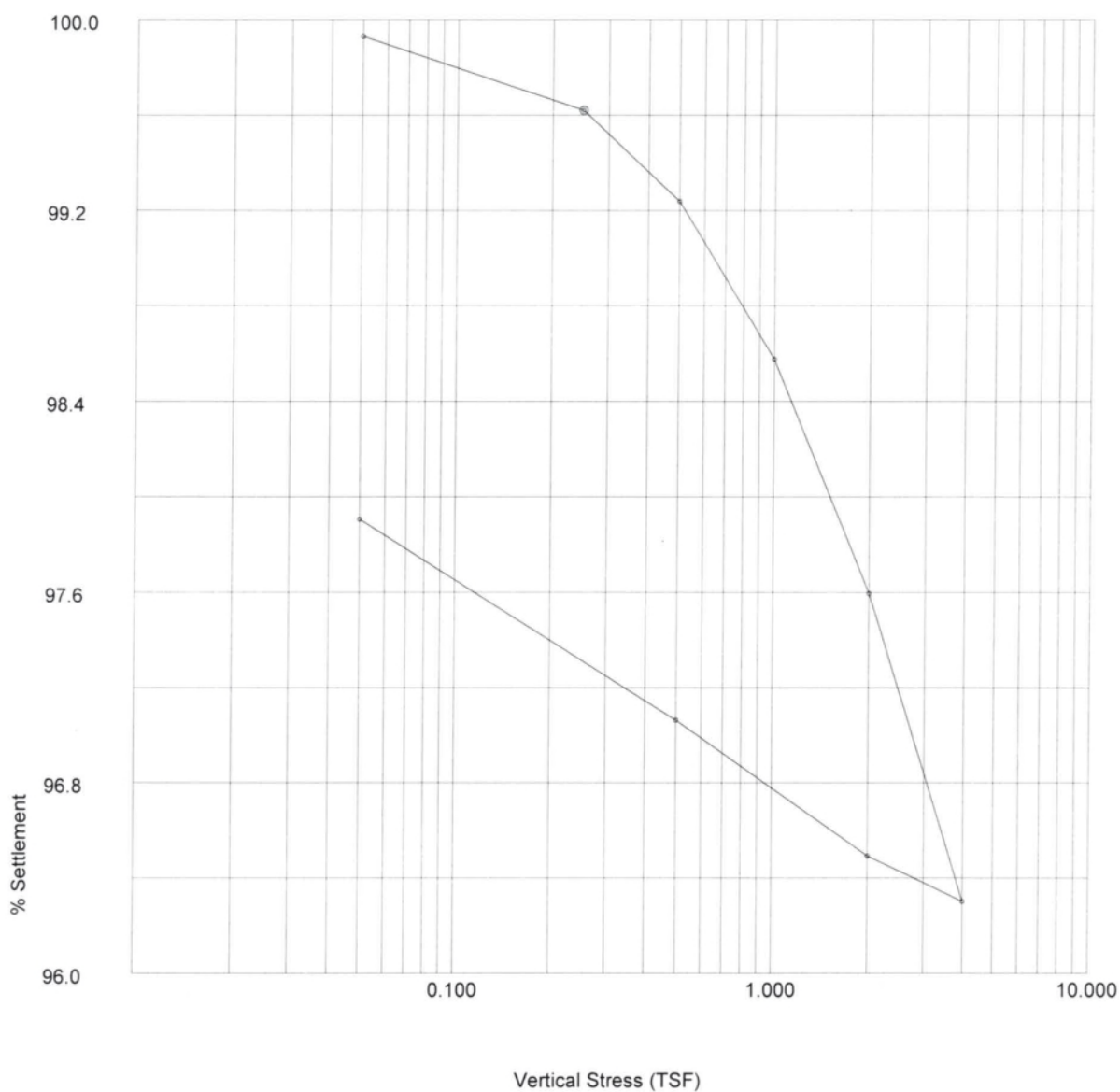
Test name: Consolidation  
Date of Test: 12-7-16

Sample: ST-8  
Borehole: L-RT-28075

Checked: *mk*

Approved:

Oedometer Settlement Tests



ASTM D2435-96

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: *mk*

Test name: Consolidation  
Date of Test: 12-7-16

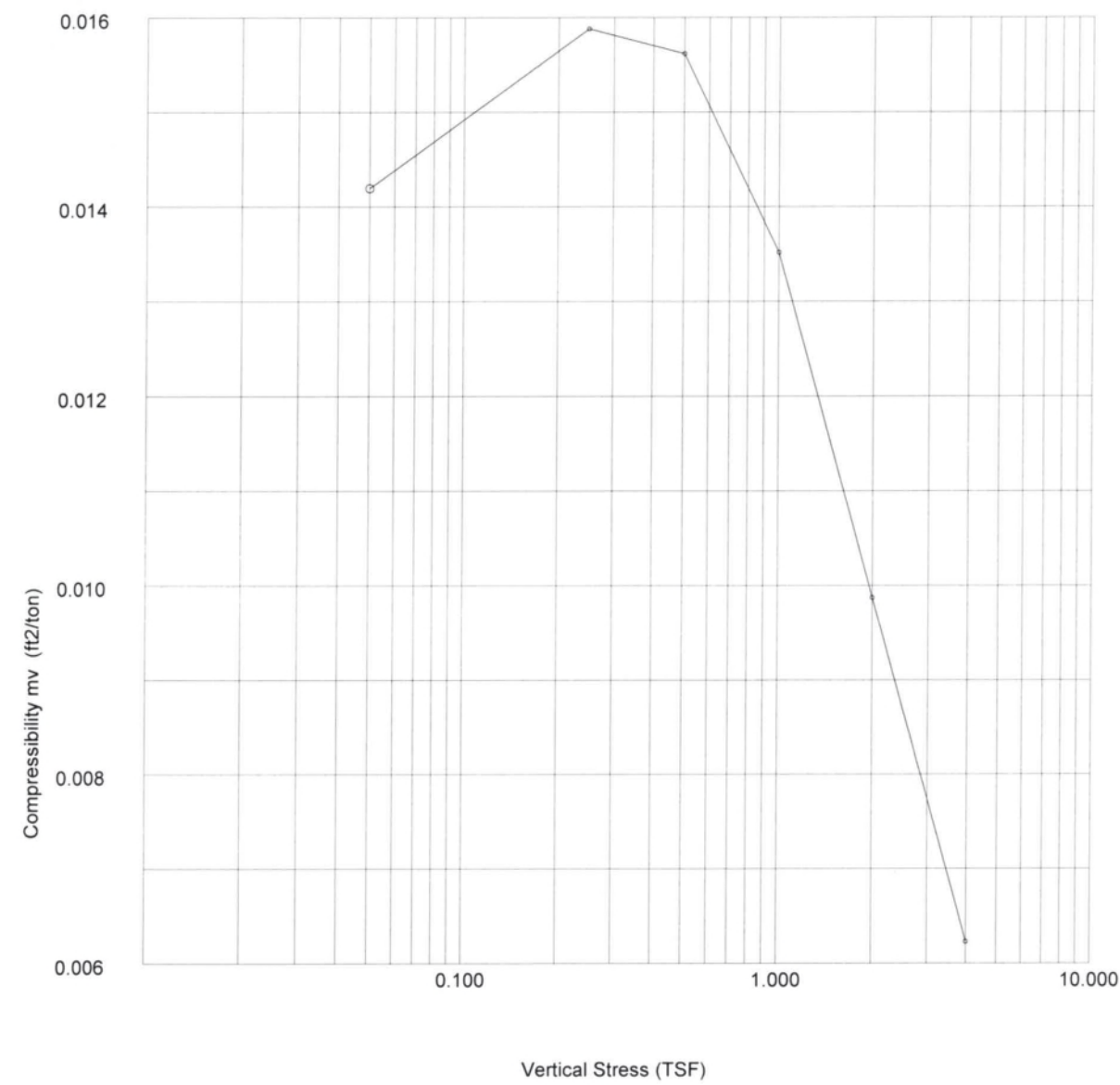
Sample: ST-8  
Borehole: L-RT-28075

Checked: *mk*

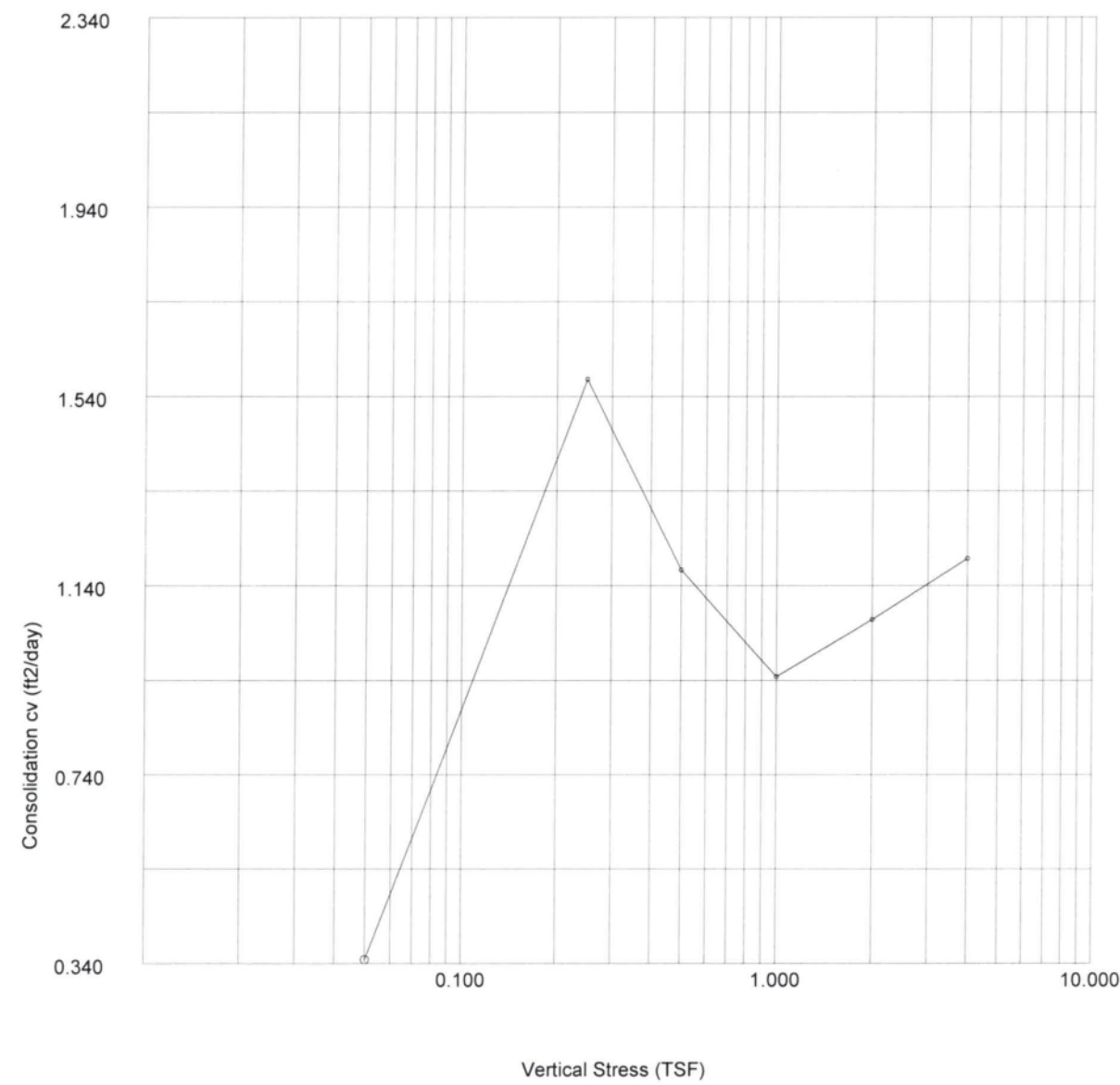
Approved:



Oedometer Settlement Tests



Oedometer Settlement Tests



	ASTM D2435-96		Test name	Consolidation
			Date of Test:	12-7-16
	Site Reference:	C.F. Harvey	Sample:	ST-8
	Jobfile:	E:\16010.JOB	Borehole:	L-RT-28075
Operator: <i>mk</i>		Checked: <i>mk</i>	Approved:	

	ASTM D2435-96		Test name	Consolidation
			Date of Test:	12-7-16
	Site Reference:	C.F. Harvey	Sample:	ST-8
	Jobfile:	E:\16010.JOB	Borehole:	L-RT-28075
Operator: <i>mk</i>		Checked: <i>mk</i>	Approved:	

Oedometer Settlement Tests

Stress (TSF)	Initial Temp. oC	Settlement Total (in)	Cal Corr. (in)	Final Temp. oC	Voids Ratio e <sub>f</sub>	t <sub>50</sub> (mins)	Secondary Compr C <sub>sec</sub>	c <sub>v</sub> (ft2/day)	m <sub>v</sub> (ft2/ton)
0.050	21.6	0.0007	0.0	21.6	0.9532	1.430	0.00	0.348	0.014
0.250	21.6	0.0038	0.0	21.6	0.9472	0.314	0.0001	1.577	0.016
0.500	21.6	0.0076	0.0	21.6	0.9397	0.420	0.00	1.173	0.015
1.000	21.6	0.0142	0.0	21.6	0.9268	0.514	0.00	0.948	0.013
2.000	21.6	0.0240	0.0	21.6	0.9076	0.448	0.0003	1.069	0.010
4.000	21.6	0.0369	0.0	21.6	0.8823	0.391	0.0004	1.197	0.007
2.000	21.6	0.0350	0.0	21.6	0.8861				0.001
0.500	21.6	0.0293	0.0	21.6	0.8972				0.004
0.050	21.6	0.0209	0.0	21.6	0.9137				0.019

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	0	0.0000	0.0000
2	0.017	1	0.0001	0.0001
3	0.033	1	0.0001	0.0001
4	0.050	2	0.0002	0.0002
5	0.067	2	0.0002	0.0002
6	0.083	2	0.0002	0.0002
7	0.100	3	0.0003	0.0003
8	0.200	3	0.0003	0.0003
9	0.400	4	0.0004	0.0004
10	0.800	4	0.0004	0.0004
11	1.000	4	0.0004	0.0004
12	2.000	5	0.0005	0.0005
13	4.000	5	0.0005	0.0005
14	8.000	6	0.0006	0.0006
15	10.000	6	0.0006	0.0006
16	20.000	7	0.0007	0.0007
17	40.000	7	0.0007	0.0007
18	80.000	7	0.0007	0.0007
19	93.330	7	0.0007	0.0007



ASTM D2435-96		Test name Consolidation	
Site Reference: C.F. Harvey		Date of Test: 12-7-16	
Jobfile: E:\16010.JOB		Sample: ST-8	
Operator: MK		Borehole: L-RT-28075	
Checked: MK		Approved:	

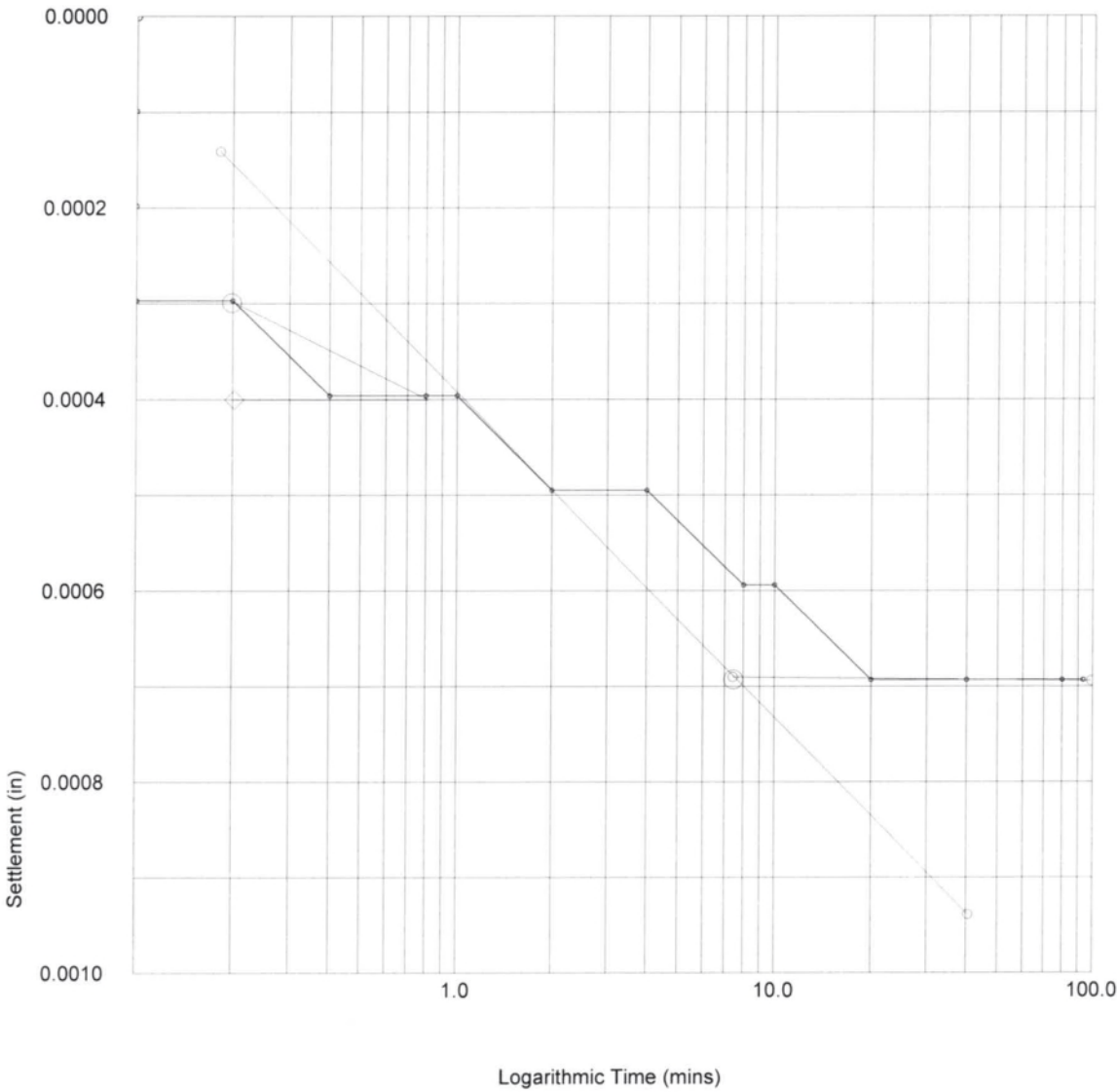


ASTM D2435-96		Test name Consolidation Load: 0.050 (TSF)	
Site Reference: C.F. Harvey		Date of Test: 12-7-16	
Jobfile: E:\16010.JOB		Sample: ST-8	
Operator: MK		Borehole: L-RT-28075	
Checked: MK		Approved:	

Oedometer Settlement Tests


Settlement Stage Results

Vertical Stress (TSF)	0.050
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0007
Voids Ratio e	0.9532
Final Temp oC	0.0
t <sub>50</sub> (mins)	1.43
c <sub>v</sub> (ft <sup>2</sup> /day)	0.348
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.014
Sec Compression C <sub>sec</sub>	0.00



Oedometer Settlement Tests

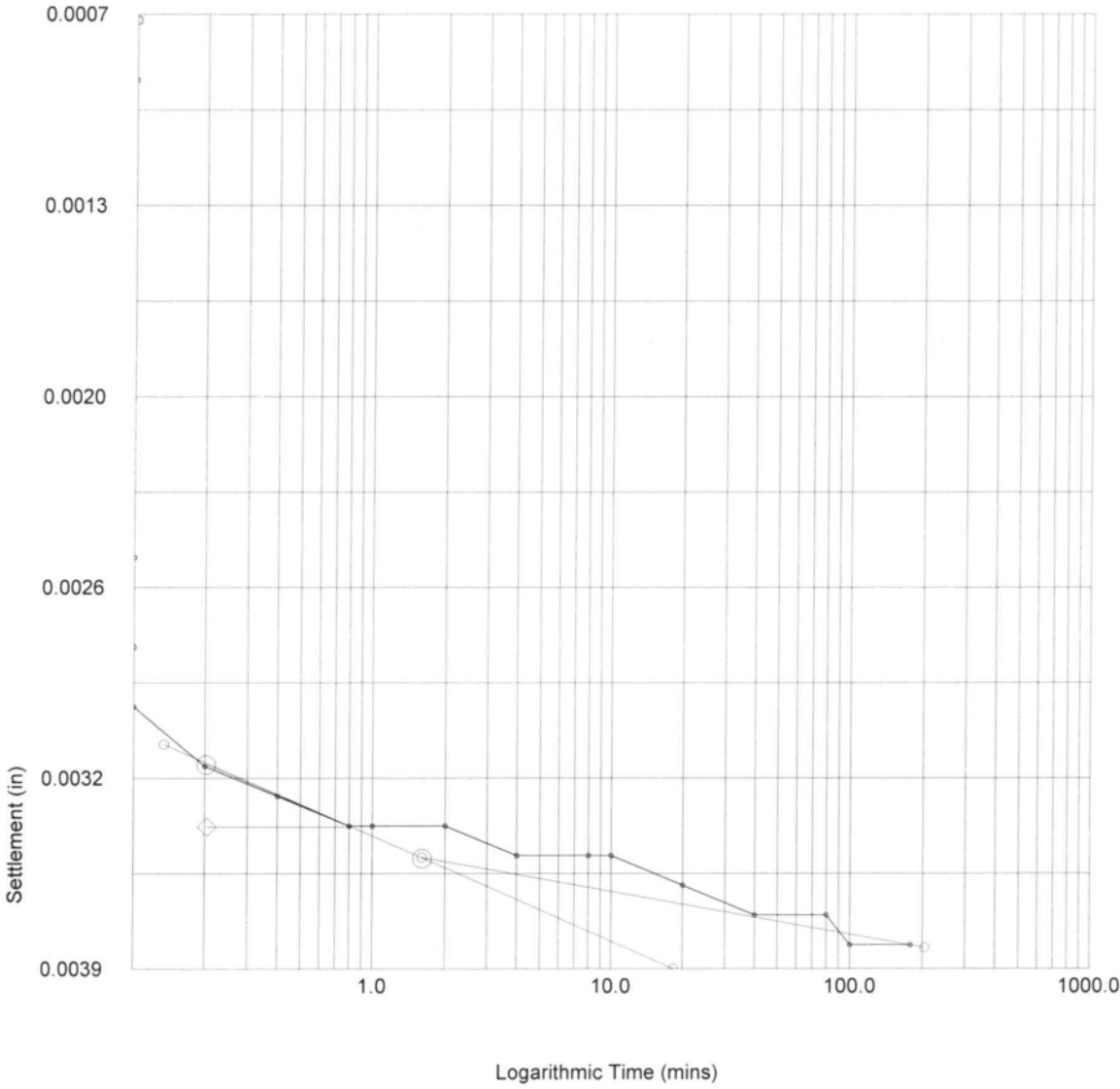
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	7	0.0007	0.0007
2	0.017	9	0.0009	0.0009
3	0.033	9	0.0009	0.0009
4	0.050	25	0.0025	0.0025
5	0.067	28	0.0028	0.0028
6	0.083	30	0.0030	0.0030
7	0.100	30	0.0030	0.0030
8	0.200	32	0.0032	0.0032
9	0.400	33	0.0033	0.0033
10	0.800	34	0.0034	0.0034
11	1.000	34	0.0034	0.0034
12	2.000	34	0.0034	0.0034
13	4.000	35	0.0035	0.0035
14	8.000	35	0.0035	0.0035
15	10.000	35	0.0035	0.0035
16	20.000	36	0.0036	0.0036
17	40.000	37	0.0037	0.0037
18	80.000	37	0.0037	0.0037
19	100.000	38	0.0038	0.0038
20	178.550	38	0.0038	0.0038

	ASTM D2435-96		Test name	Consolidation Load: 0.250 (TSF)	
			Date of Test:	12-7-16	
	Site Reference:	C.F. Harvey	Sample:	ST-8	
	Jobfile:	E:\16010.JOB	Borehole:	L-RT-28075	
	Operator: <i>mlc</i>		Checked: <i>mlc</i>	Approved:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.250
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0031
Voids Ratio e	0.9472
Final Temp oC	0.0
t <sub>50</sub> (mins)	0.31
c <sub>v</sub> (ft <sup>2</sup> /day)	1.577
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.016
Sec Compression C <sub>sec</sub>	0.0001



ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	12-7-16
Jobfile: E:\16010.JOB		Sample:	ST-8
Operator: <i>mk</i>		Borehole:	L-RT-28075
Checked: <i>mk</i>		Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	38	0.0038	0.0038
2	0.017	41	0.0041	0.0041
3	0.033	41	0.0041	0.0041
4	0.050	61	0.0061	0.0061
5	0.067	64	0.0064	0.0064
6	0.083	65	0.0065	0.0065
7	0.100	66	0.0066	0.0066
8	0.200	69	0.0069	0.0069
9	0.400	71	0.0071	0.0071
10	0.800	72	0.0072	0.0072
11	1.000	72	0.0072	0.0072
12	2.000	72	0.0072	0.0072
13	4.000	73	0.0073	0.0073
14	8.000	73	0.0073	0.0073
15	10.000	73	0.0073	0.0073
16	20.000	74	0.0074	0.0074
17	40.000	75	0.0075	0.0075
18	80.000	76	0.0076	0.0076
19	100.000	76	0.0076	0.0076
20	135.067	76	0.0076	0.0076



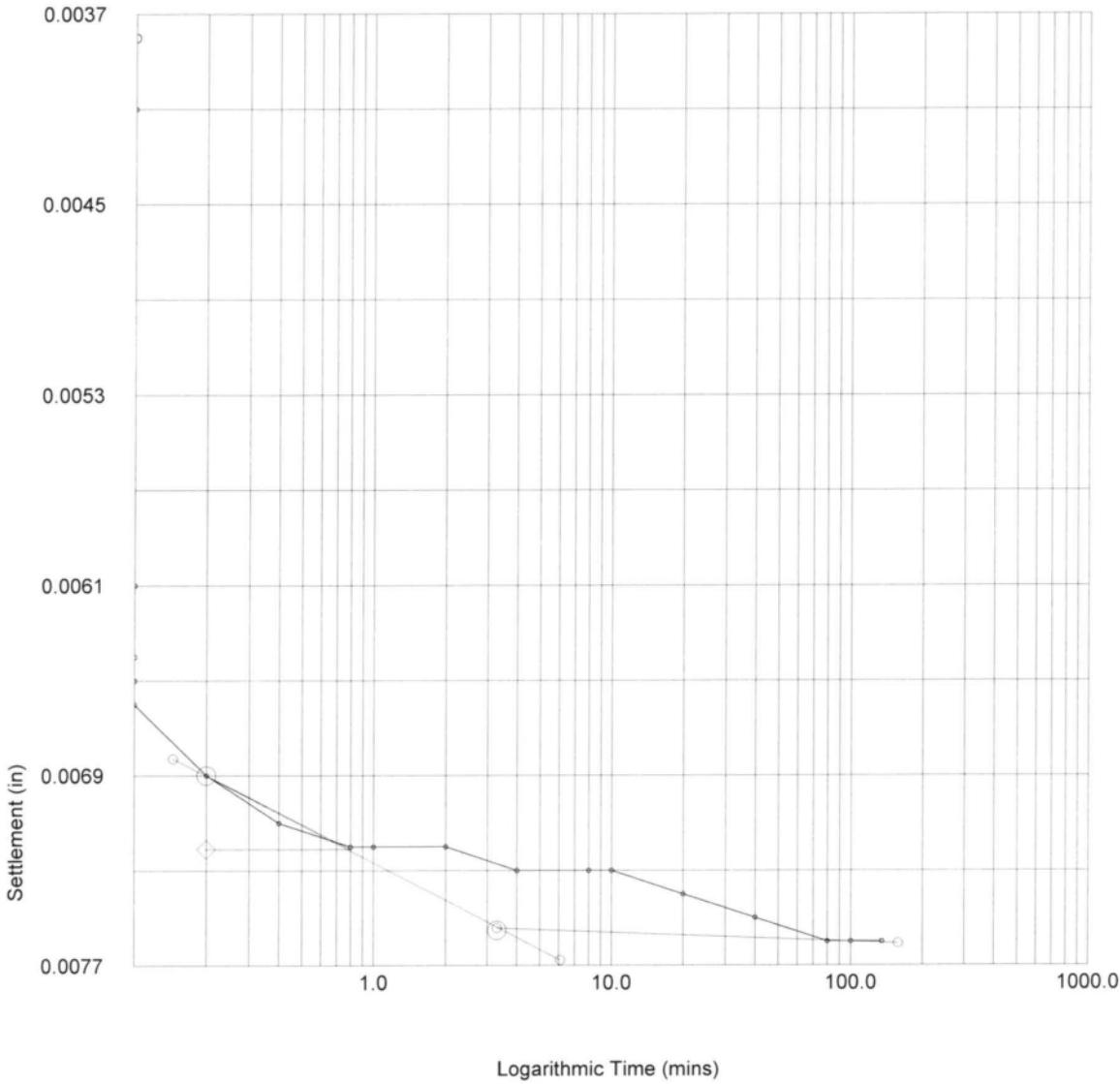
ASTM D2435-96		Test name	Consolidation Load: 0.500 (TSF)
Site Reference: C.F. Harvey		Date of Test:	12-7-16
Jobfile: E:\16010.JOB		Sample:	ST-8
Operator: <i>mk</i>		Borehole:	L-RT-28075
Checked: <i>mk</i>		Approved:	



Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.500
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0038
Voids Ratio e	0.9397
Final Temp oC	0.0
t <sub>50</sub> (mins)	0.42
c <sub>v</sub> (ft <sup>2</sup> /day)	1.173
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.015
Sec Compression C <sub>sec</sub>	0.00



ASTM D2435-96	Test name Consolidation
Site Reference: C.F. Harvey	Date of Test: 12-7-16
Jobfile: E:\16010.JOB	Sample: ST-8
Operator: <i>mk</i>	Borehole: L-RT-28075
Checked: <i>mk</i>	Approved:

Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	76	0.0076	0.0076
2	0.017	81	0.0081	0.0081
3	0.033	116	0.0116	0.0116
4	0.050	122	0.0122	0.0122
5	0.067	123	0.0123	0.0123
6	0.083	126	0.0126	0.0126
7	0.100	127	0.0127	0.0127
8	0.200	130	0.0130	0.0130
9	0.400	133	0.0133	0.0133
10	0.800	135	0.0135	0.0135
11	1.000	135	0.0135	0.0135
12	2.000	136	0.0136	0.0136
13	4.000	137	0.0137	0.0137
14	8.000	138	0.0138	0.0138
15	10.000	139	0.0139	0.0139
16	20.000	140	0.0140	0.0140
17	40.000	141	0.0141	0.0141
18	80.000	142	0.0142	0.0142
19	100.000	142	0.0142	0.0142
20	163.330	142	0.0142	0.0142

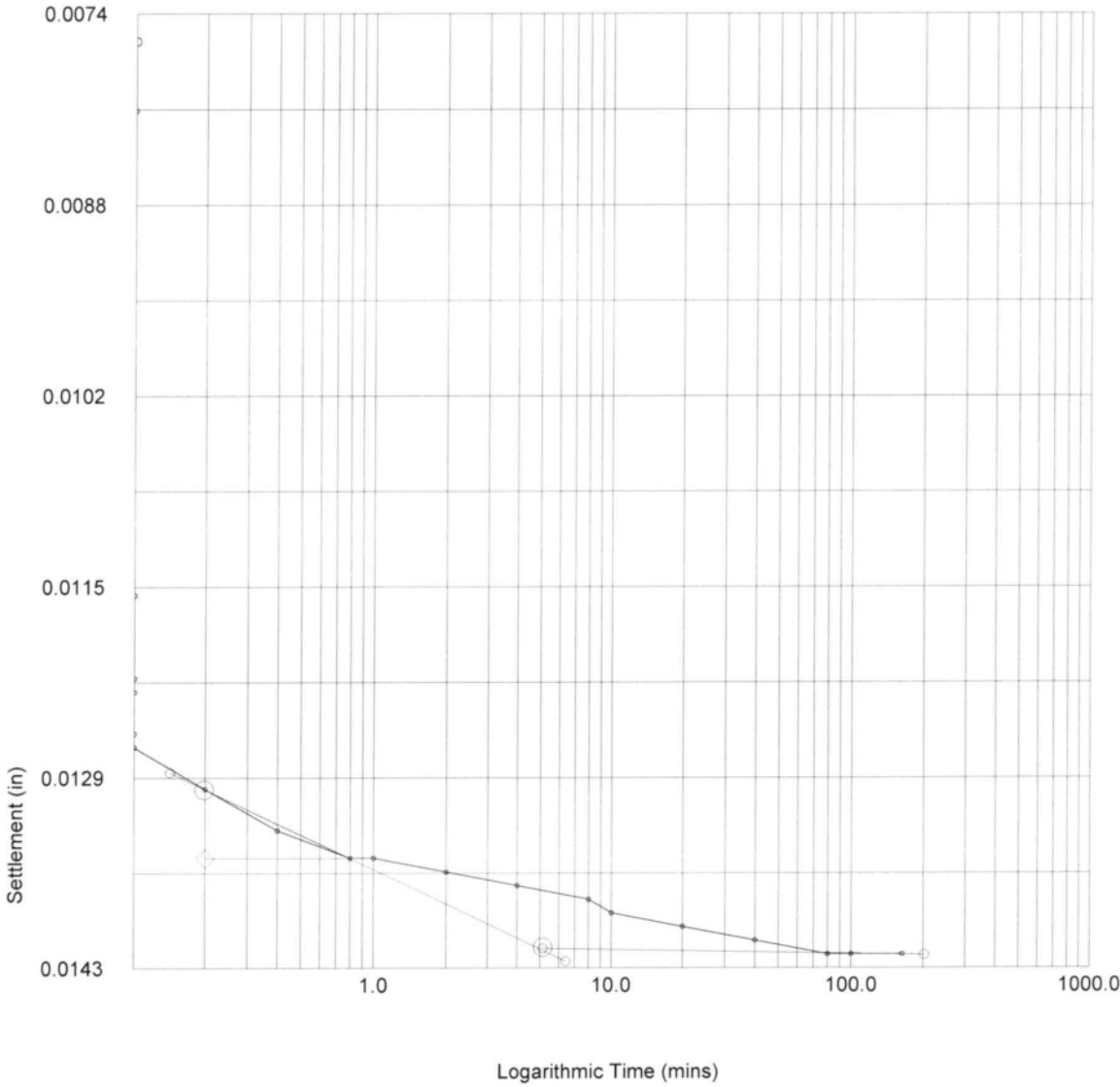


ASTM D2435-96	Test name Consolidation Load: 1.000 (TSF)
Site Reference: C.F. Harvey	Date of Test: 12-7-16
Jobfile: E:\16010.JOB	Sample: ST-8
Operator: <i>mk</i>	Borehole: L-RT-28075
Checked: <i>mk</i>	Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	1.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0066
Voids Ratio e	0.9268
Final Temp oC	0.0
t <sub>50</sub> (mins)	0.51
c <sub>v</sub> (ft <sup>2</sup> /day)	0.948
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.013
Sec Compression C <sub>sec</sub>	0.00



ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	12-7-16
Jobfile: E:\16010.JOB		Sample:	ST-8
Operator: <i>ml</i>		Borehole:	L-RT-28075
Checked: <i>ml</i>		Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	142	0.0142	0.0142
2	0.017	144	0.0144	0.0144
3	0.033	171	0.0171	0.0171
4	0.050	201	0.0201	0.0201
5	0.067	209	0.0209	0.0209
6	0.083	211	0.0211	0.0211
7	0.100	213	0.0213	0.0213
8	0.200	218	0.0218	0.0218
9	0.400	223	0.0223	0.0223
10	0.800	225	0.0225	0.0225
11	1.000	225	0.0225	0.0225
12	2.000	227	0.0227	0.0227
13	4.000	230	0.0230	0.0230
14	8.000	231	0.0231	0.0231
15	10.000	232	0.0232	0.0232
16	20.000	233	0.0233	0.0233
17	40.000	234	0.0234	0.0234
18	80.000	235	0.0235	0.0235
19	100.000	235	0.0235	0.0235
20	200.000	238	0.0238	0.0238
21	400.000	239	0.0239	0.0239
22	800.000	240	0.0240	0.0240
23	948.650	240	0.0240	0.0240

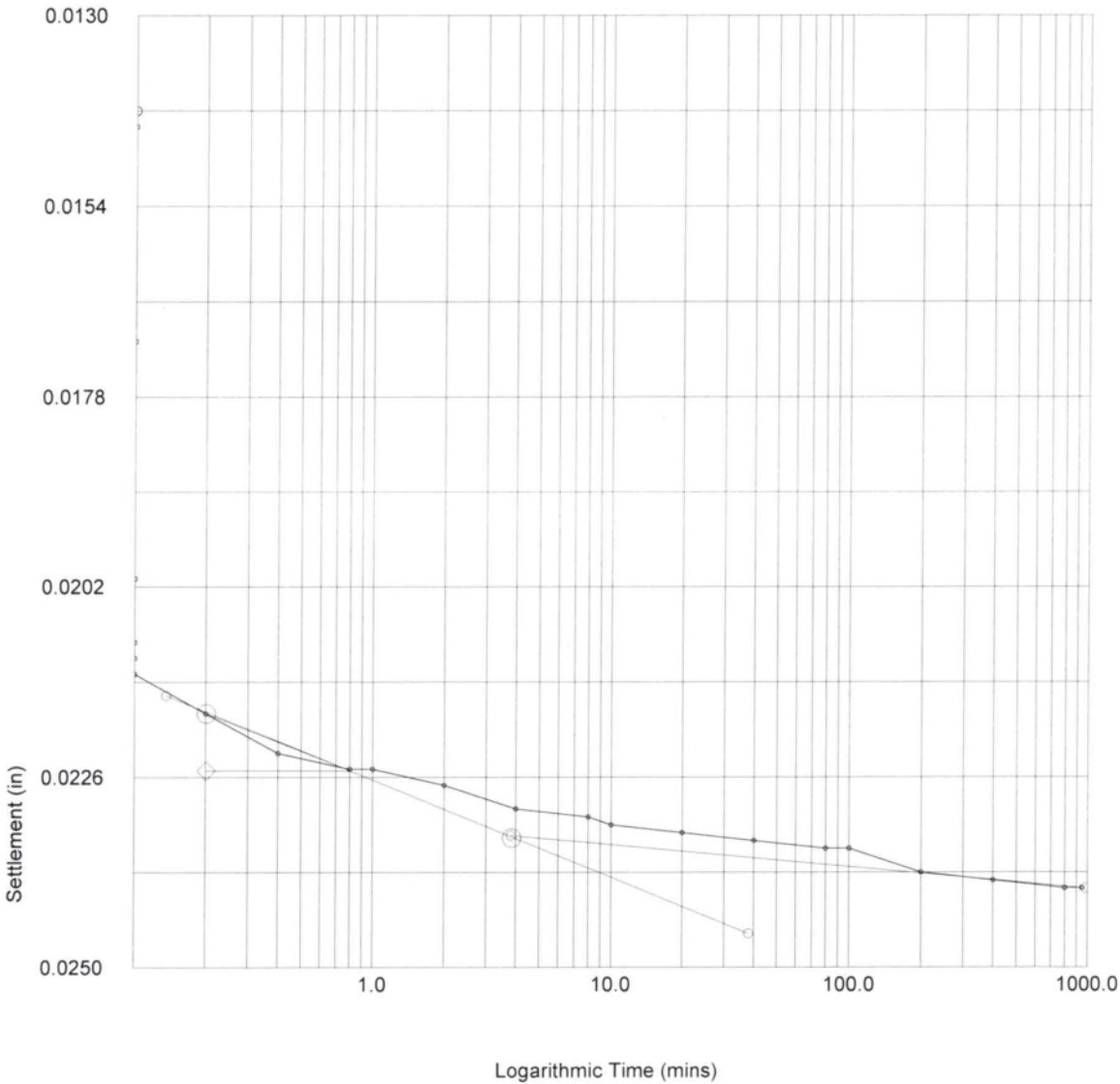


ASTM D2435-96		Test name	Consolidation Load: 2.000 (TSF)
Site Reference: C.F. Harvey		Date of Test:	12-7-16
Jobfile: E:\16010.JOB		Sample:	ST-8
Operator: <i>ml</i>		Borehole:	L-RT-28075
Checked: <i>ml</i>		Approved:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	2.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0098
Voids Ratio e	0.9076
Final Temp oC	0.0
t <sub>50</sub> (mins)	0.45
c <sub>v</sub> (ft <sup>2</sup> /day)	1.069
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.01
Sec Compression C <sub>sec</sub>	0.0003



ASTM D2435-96	Test name	Consolidation
Site Reference: C.F. Harvey	Date of Test:	12-7-16
Jobfile: E:\16010.JOB	Sample:	ST-8
Operator: <i>me</i>	Borehole:	L-RT-28075
Checked: <i>me</i>	Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	240	0.0240	0.0240
2	0.017	256	0.0256	0.0256
3	0.033	256	0.0256	0.0256
4	0.050	310	0.0310	0.0310
5	0.067	320	0.0320	0.0320
6	0.083	327	0.0327	0.0327
7	0.100	329	0.0329	0.0329
8	0.200	338	0.0338	0.0338
9	0.400	344	0.0344	0.0344
10	0.800	349	0.0349	0.0349
11	1.000	350	0.0350	0.0350
12	2.000	353	0.0353	0.0353
13	4.000	356	0.0356	0.0356
14	8.000	359	0.0359	0.0359
15	10.000	360	0.0360	0.0360
16	20.333	362	0.0362	0.0362
17	40.333	364	0.0364	0.0364
18	80.333	367	0.0367	0.0367
19	100.333	367	0.0367	0.0367
20	200.333	369	0.0369	0.0369
21	244.517	369	0.0369	0.0369



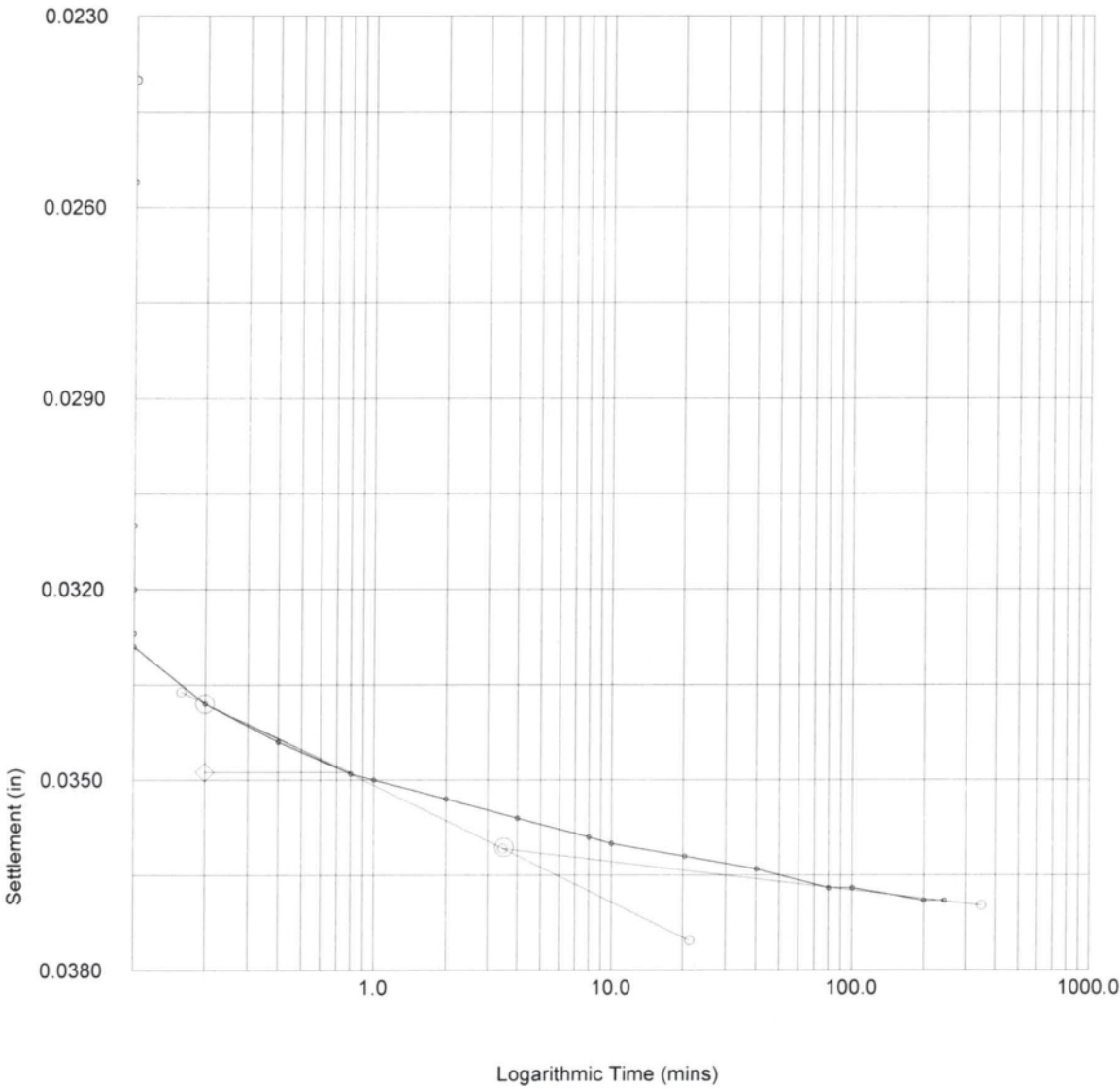
ASTM D2435-96	Test name	Consolidation Load: 4.000 (TSF)
Site Reference: C.F. Harvey	Date of Test:	12-7-16
Jobfile: E:\16010.JOB	Sample:	ST-8
Operator: <i>me</i>	Borehole:	L-RT-28075
Checked: <i>me</i>	Approved:	



Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	4.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0129
Voids Ratio e	0.8823
Final Temp oC	0.0
t <sub>50</sub> (mins)	0.39
c <sub>v</sub> (ft <sup>2</sup> /day)	1.197
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.007
Sec Compression C <sub>sec</sub>	0.0004



ASTM D2435-96	Test name Consolidation
Site Reference: C.F. Harvey	Date of Test: 12-7-16
Jobfile: E:\16010.JOB	Sample: ST-8
Operator: <i>mk</i>	Borehole: L-RT-28075
Checked: <i>mk</i>	Approved:

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	369	0.0369	0.0369
2	0.017	361	0.0361	0.0361
3	0.033	354	0.0354	0.0354
4	0.050	353	0.0353	0.0353
5	0.067	353	0.0353	0.0353
6	0.083	353	0.0353	0.0353
7	0.100	353	0.0353	0.0353
8	0.200	353	0.0353	0.0353
9	0.400	352	0.0352	0.0352
10	0.800	352	0.0352	0.0352
11	1.000	352	0.0352	0.0352
12	2.000	352	0.0352	0.0352
13	4.000	352	0.0352	0.0352
14	8.000	351	0.0351	0.0351
15	10.000	351	0.0351	0.0351
16	20.000	351	0.0351	0.0351
17	40.000	351	0.0351	0.0351
18	80.000	350	0.0350	0.0350
19	100.000	350	0.0350	0.0350
20	117.767	350	0.0350	0.0350



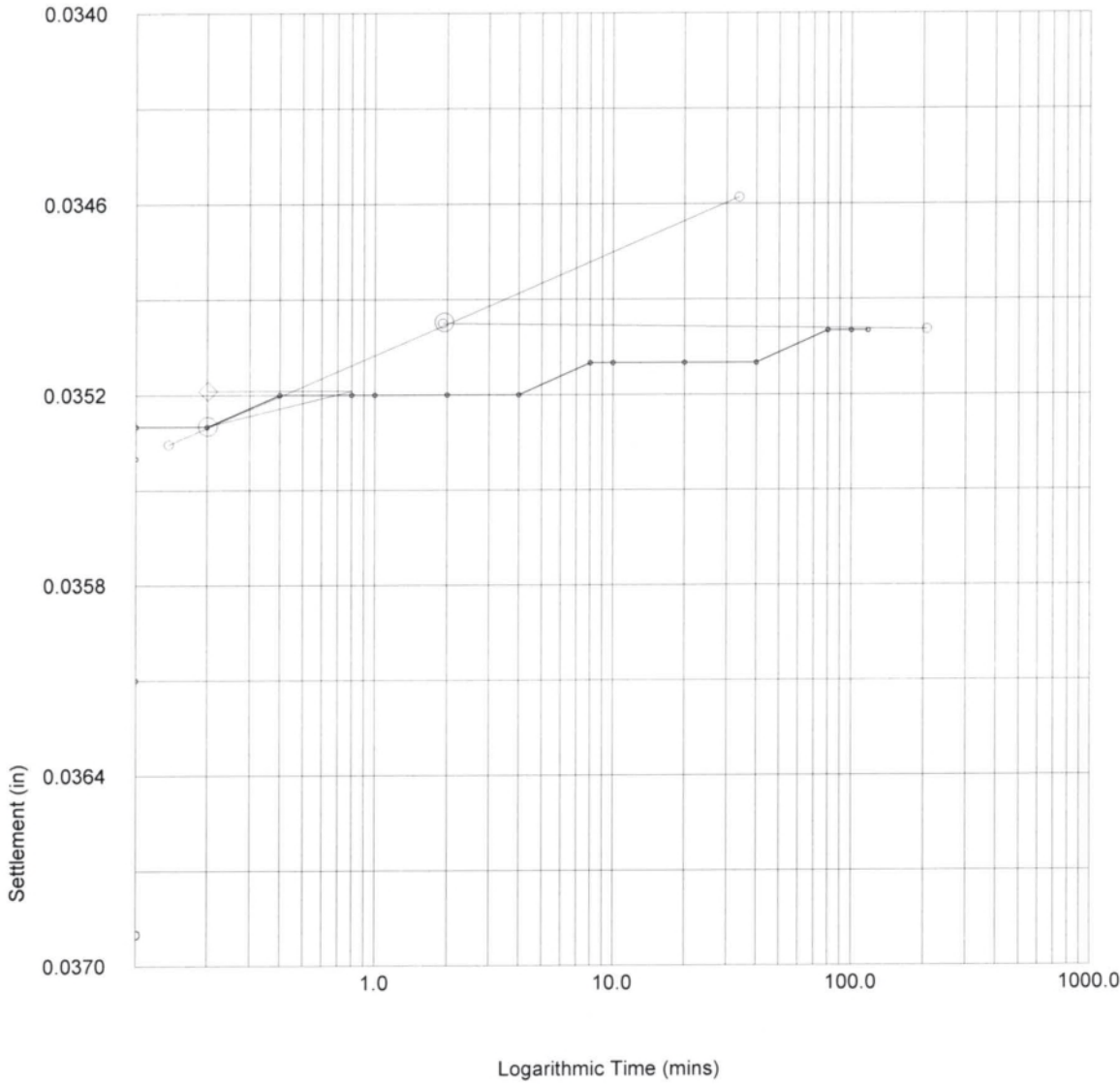
ASTM D2435-96	Test name Consolidation Load: 2.000 (TSF)
Site Reference: C.F. Harvey	Date of Test: 12-7-16
Jobfile: E:\16010.JOB	Sample: ST-8
Operator: <i>mk</i>	Borehole: L-RT-28075
Checked: <i>mk</i>	Approved:



Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF) 2.000  
Initial Temp oC 21.6  
Correction (in) 0.0  
Settlement (in) 0.0019  
Voids Ratio e 0.8861  
  
Final Temp oC  
t<sub>50</sub> (mins)  
c<sub>v</sub> (ft<sup>2</sup>/day)  
m<sub>v</sub> (ft<sup>2</sup>/ton)  
Sec Compression C<sub>sec</sub>



	ASTM D2435-96		Test name	Consolidation
			Date of Test:	12-7-16
	Site Reference:	C.F. Harvey	Sample:	ST-8
	Jobfile:	E:\16010.JOB	Borehole:	L-RT-28075
Operator: <i>mk</i>		Checked: <i>mk</i>	Approved:	

Oedometer Settlement Tests

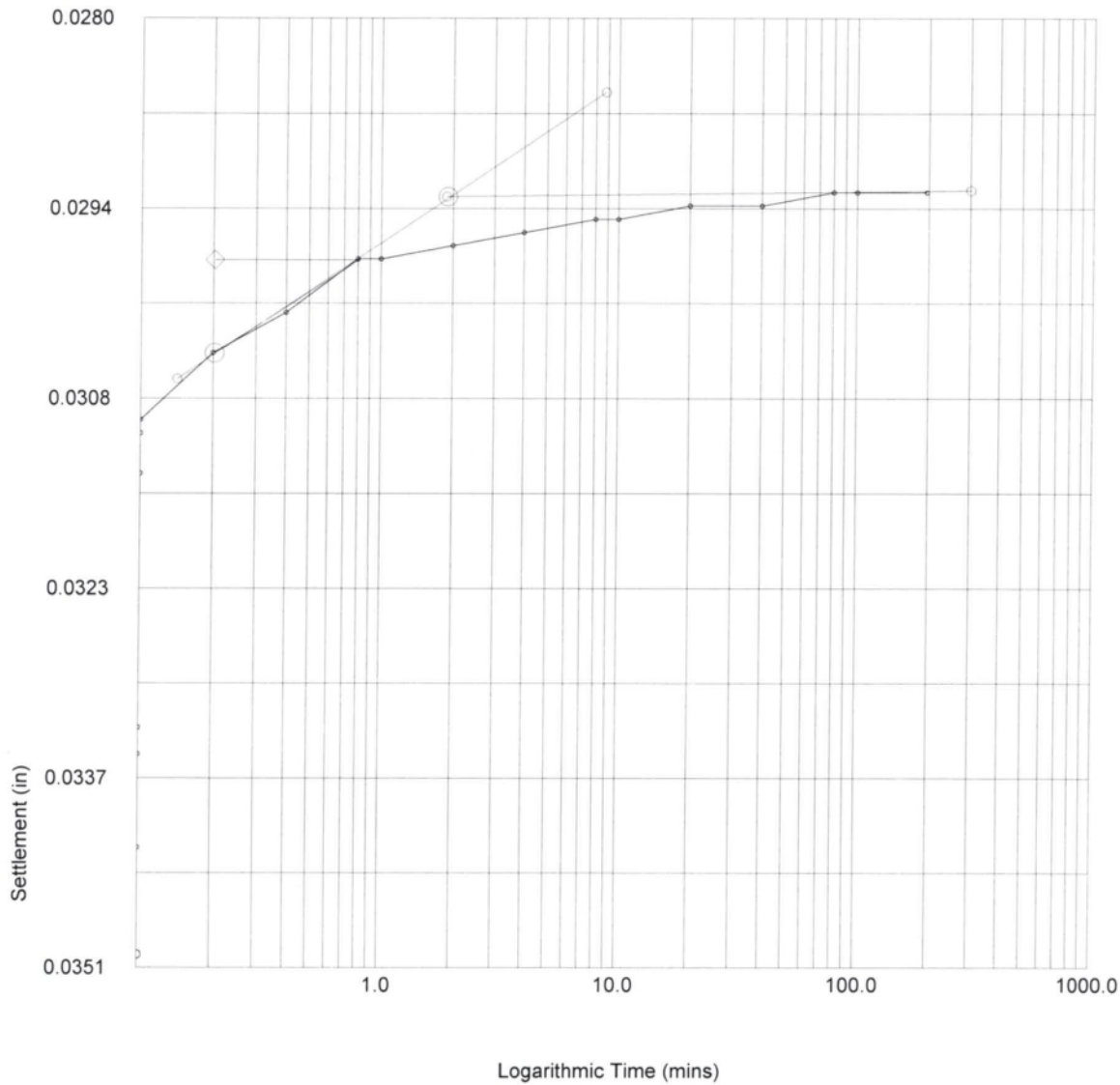
No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	350	0.0350	0.0350
2	0.017	342	0.0342	0.0342
3	0.033	335	0.0335	0.0335
4	0.050	333	0.0333	0.0333
5	0.067	314	0.0314	0.0314
6	0.083	311	0.0311	0.0311
7	0.100	310	0.0310	0.0310
8	0.200	305	0.0305	0.0305
9	0.400	302	0.0302	0.0302
10	0.800	298	0.0298	0.0298
11	1.000	298	0.0298	0.0298
12	2.000	297	0.0297	0.0297
13	4.000	296	0.0296	0.0296
14	8.000	295	0.0295	0.0295
15	10.000	295	0.0295	0.0295
16	20.000	294	0.0294	0.0294
17	40.000	294	0.0294	0.0294
18	80.000	293	0.0293	0.0293
19	100.000	293	0.0293	0.0293
20	196.130	293	0.0293	0.0293

	ASTM D2435-96		Test name	Consolidation Load: 0.500 (TSF)
			Date of Test:	12-7-16
	Site Reference:	C.F. Harvey	Sample:	ST-8
	Jobfile:	E:\16010.JOB	Borehole:	L-RT-28075
Operator: <i>mk</i>		Checked: <i>mk</i>	Approved:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF) 0.500  
Initial Temp oC 21.6  
Correction (in) 0.0  
Settlement (in) 0.0057  
Voids Ratio e 0.8972  
  
Final Temp oC  
t<sub>50</sub> (mins)  
c<sub>v</sub> (ft<sup>2</sup>/day)  
m<sub>v</sub> (ft<sup>2</sup>/ton)  
Sec Compression C<sub>sec</sub>



ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	12-7-16
Jobfile: E:\16010.JOB		Sample:	ST-8
Operator: <i>mk</i>		Borehole:	L-RT-28075
Checked: <i>mk</i>		Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	293	0.0293	0.0293
2	0.017	291	0.0291	0.0291
3	0.033	274	0.0274	0.0274
4	0.050	260	0.0260	0.0260
5	0.067	257	0.0257	0.0257
6	0.083	256	0.0256	0.0256
7	0.100	253	0.0253	0.0253
8	0.200	246	0.0246	0.0246
9	0.400	238	0.0238	0.0238
10	0.800	232	0.0232	0.0232
11	1.000	230	0.0230	0.0230
12	2.000	225	0.0225	0.0225
13	4.000	221	0.0221	0.0221
14	8.000	218	0.0218	0.0218
15	10.000	217	0.0217	0.0217
16	20.000	215	0.0215	0.0215
17	40.000	213	0.0213	0.0213
18	80.000	212	0.0212	0.0212
19	100.000	211	0.0211	0.0211
20	200.000	211	0.0211	0.0211
21	400.000	210	0.0210	0.0210
22	800.000	209	0.0209	0.0209
23	930.983	209	0.0209	0.0209

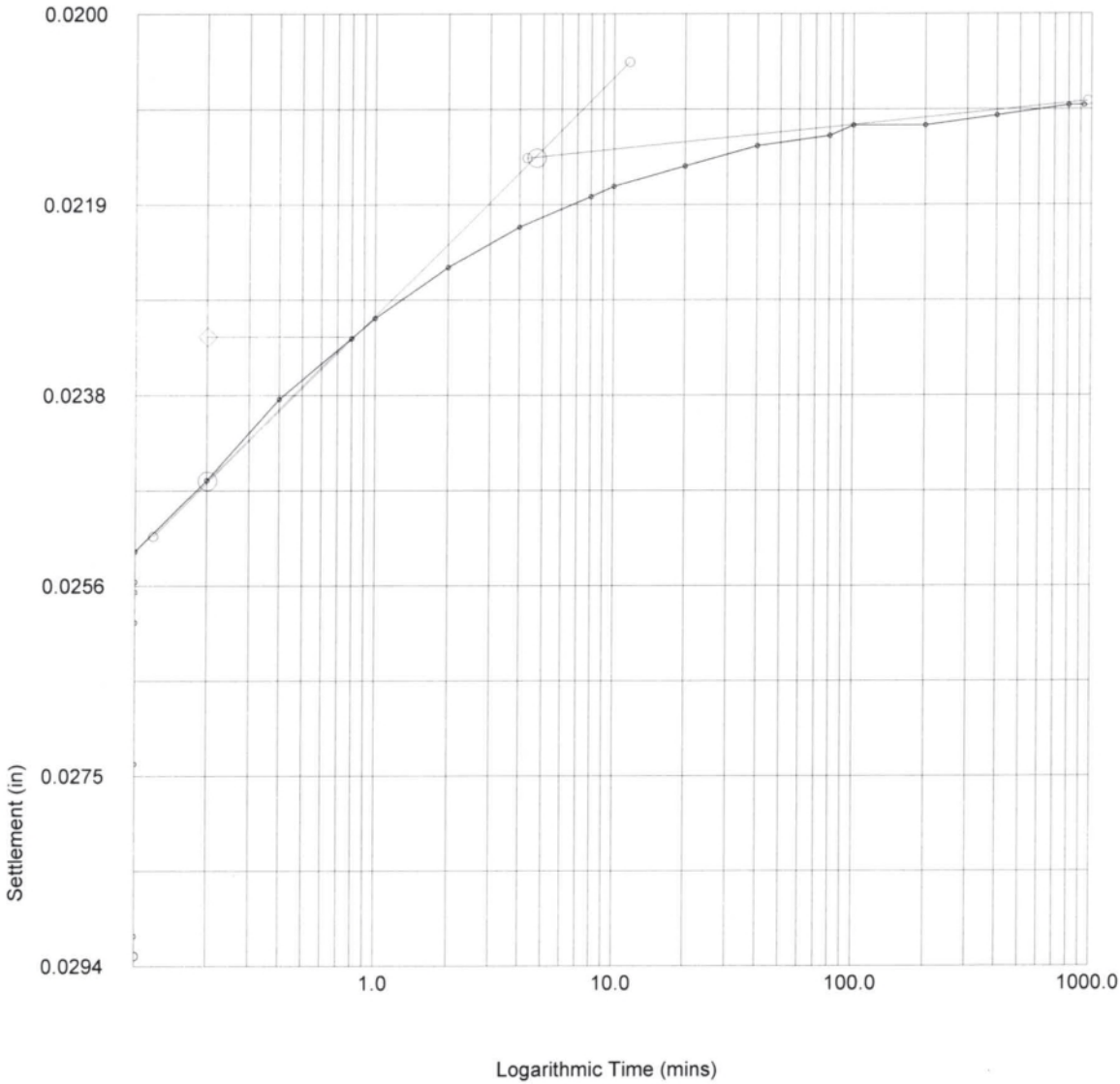


ASTM D2435-96		Test name	Consolidation Load: 0.050 (TSF)
Site Reference: C.F. Harvey		Date of Test:	12-7-16
Jobfile: E:\16010.JOB		Sample:	ST-8
Operator: <i>mk</i>		Borehole:	L-RT-28075
Checked: <i>mk</i>		Approved:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.050
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0084
Voids Ratio e	0.9137
Final Temp oC	
t <sub>50</sub> (mins)	
c <sub>v</sub> (ft <sup>2</sup> /day)	
m <sub>v</sub> (ft <sup>2</sup> /ton)	
Sec Compression C <sub>sec</sub>	



Effective Stress Triaxial Compression

Consolidated Undrained

Sample details

Sketch showing specimen location in original Sample



Depth	15.0 - 17.0 ft.		
Description:	Dark Gray Coarse to Fine Sandy Silty CLAY (A-6) (0)		
Type	Specimen 1	Specimen 2	Specimen 3
Height H <sub>0</sub> (in)	Undisturbed	Undisturbed	Undisturbed
Diameter D <sub>0</sub> (in)	5.974	5.951	5.863
Weight W <sub>0</sub> (gr)	2.864	2.864	2.865
Bulk Density ρ (PCF)	1167.6	1176	1170.8
Particle Density ρ <sub>s</sub>	115.58	116.86	118.00
	2.661	2.661	2.661
	(measured)	(measured)	(measured)

Initial Conditions

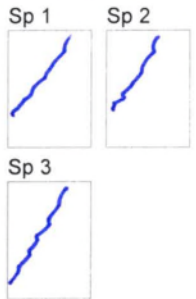
	Specimen 1	Specimen 2	Specimen 3
Cell Pressure σ <sub>3</sub> (lbf/in <sup>2</sup> )	7.0	16.0	26.0
Pore Pressure u (lbf/in <sup>2</sup> )	0.0	0.0	0.0
Machine Speed d <sub>r</sub> (in/min)	0.0079	0.0091	0.0068
No. of Membranes	1	1	1
Total Thickness (in)	0.012	0.012	0.012
Strain Channel	1798	1798	1798
Load Channel	1776	1776	1776
Pore P. Channel	1779	1779	1779
Volume Channel	Volume Chang	Volume Chang	Volume Chang
Moisture Content w <sub>0</sub> %	36.9	35.7	37.6
Dry Density ρ <sub>d0</sub> (PCF)	84.45	86.12	85.76
Voids Ratio e <sub>0</sub>	0.97	0.93	0.94
Deg of Saturation S <sub>0</sub> %	100.00	100.00	100.00
Final B Value	0.98	0.97	0.98

Final Conditions

	Specimen 1	Specimen 2	Specimen 3
Moisture Content w <sub>f</sub> %	33.8	31.8	31.5
Dry Density ρ <sub>d</sub> (PCF)	86.50	88.85	89.27
Voids Ratio e <sub>f</sub>	0.92	0.87	0.86
Deg of Saturation S <sub>f</sub> %	97.93	97.53	97.61
Failure Criteria	Mx Stress Ratio	Mx Stress Ratio	Mx Stress Ratio
Axial Strain ε <sub>f</sub> %	4.0	4.0	4.0
Corr Dev Stress (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub> (lbf/in <sup>2</sup> )	14.9	30.2	47.1
Minor Stress σ <sub>3f</sub> (lbf/in <sup>2</sup> )	3.8	7.3	13.5
Major Stress σ <sub>1f</sub> (lbf/in <sup>2</sup> )	18.7	37.5	60.6
Stress Ratio (σ <sub>1</sub> /σ <sub>3</sub> ) <sub>f</sub>	4.9	5.1	4.5

Notes:

Failure Sketch



Surface Inclination



ASTM D2435-96	Test name	Consolidation
	Date of Test:	12-7-16
Site Reference: C.F. Harvey	Sample:	ST-8
Jobfile: E:\16010.JOB	Borehole:	L-RT-28075
Operator: <i>mlk</i>	Checked: <i>mlk</i>	Approved:

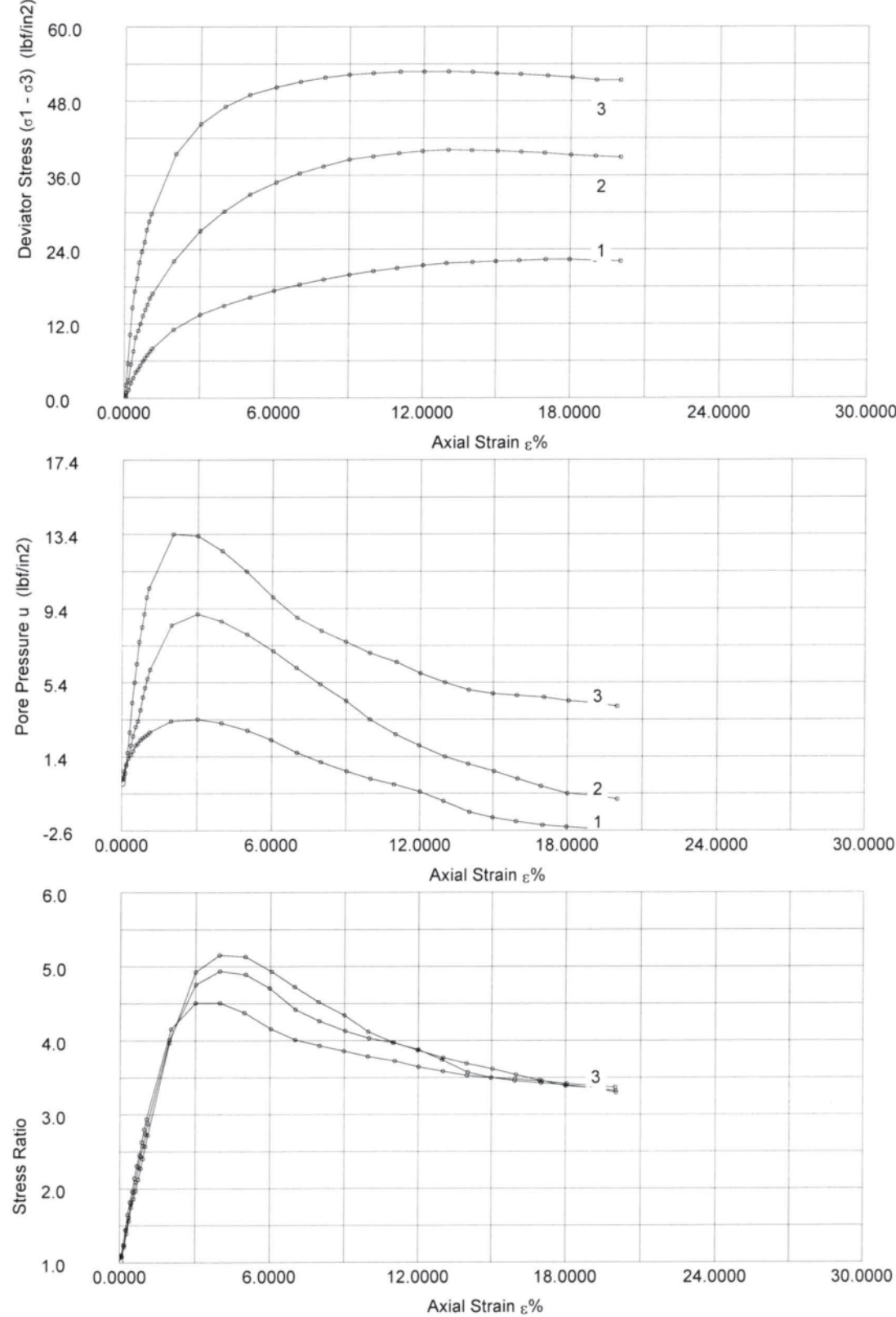


Test Method: ASTM D4767-95	Test name	CU Triaxial (SS, MS)
	Date of Test:	12-7-16
Site Reference: C.F. Harvey	Sample:	ST-8
Jobfile: E:\16010.JOB	Borehole:	L-RT-28075
Operator: <i>mlk</i>	Checked: <i>mlk</i>	Approved:



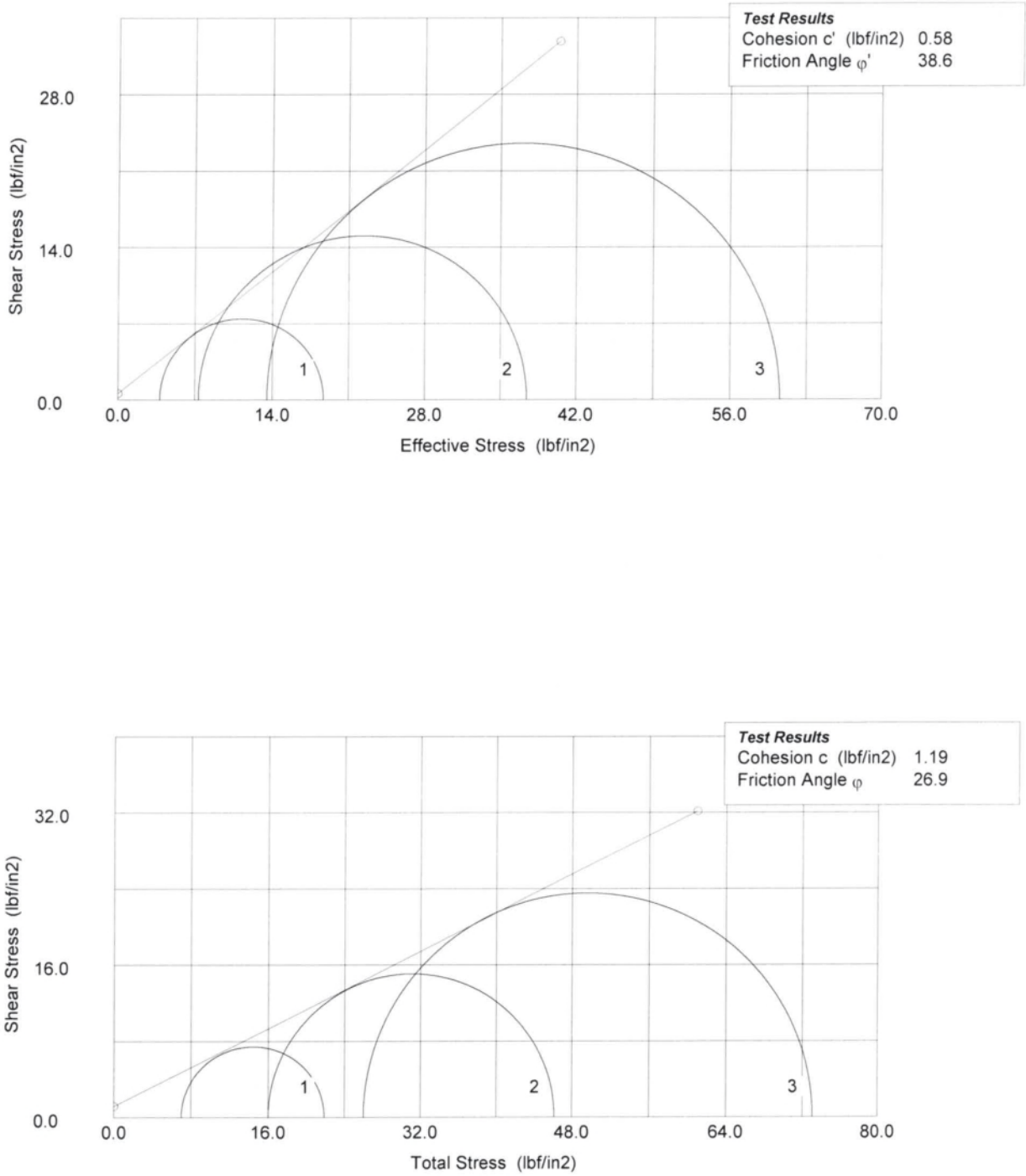
Effective Stress Triaxial Compression

Consolidated Undrained



Effective Stress Triaxial Compression

Consolidated Undrained



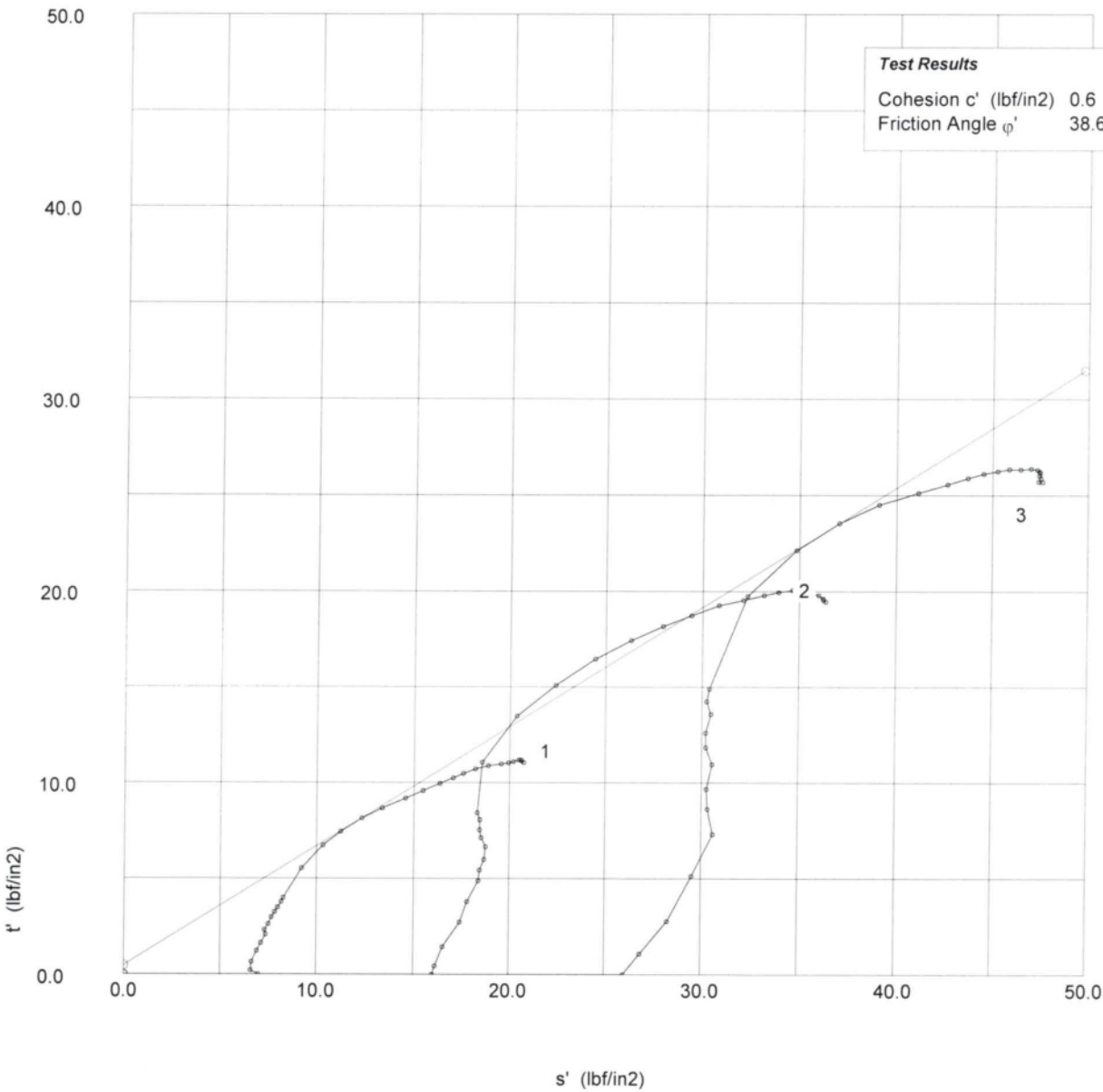
Test Method: ASTM D4767-95	Test name CU Triaxial (SS, MS)
Site Reference: C.F. Harvey	Date of Test: 12-7-16
Jobfile: E:\16010.JOB	Sample: ST-8
Operator: <i>ML</i>	Borehole: L-RT-28075
Checked: <i>ML</i>	Approved:



Test Method: ASTM D4767-95	Test name CU Triaxial (SS, MS)
Site Reference: C.F. Harvey	Date of Test: 12-7-16
Jobfile: E:\16010.JOB	Sample: ST-8
Operator: <i>ML</i>	Borehole: L-RT-28075
Checked: <i>ML</i>	Approved:

Effective Stress Triaxial Compression

Consolidated Undrained



Test Method: ASTM D4767-95		Test name CU Triaxial (SS, MS)	
Site Reference: C.F. Harvey		Date of Test: 12-7-16	
Jobfile: E:\16010.JOB		Sample: ST-8	
Operator: <i>mlk</i>		Borehole: L-RT-28075	
Checked: <i>mlk</i>		Approved:	

Effective Stress Triaxial Compression

Consolidated Undrained Shear (Specimen 1)

No.	Strain (divs)	Strain $\epsilon\%$	Load (divs)	Load (lbs)	Pore Prs (divs)	Pore Prs (lb/in <sup>2</sup> )	D. Stress $(\sigma_1 - \sigma_3)_m$ (lb/in <sup>2</sup> )	D. Stress $(\sigma_1 - \sigma_3)_c$ (lb/in <sup>2</sup> )	Minor Str $\sigma_3$ (lb/in <sup>2</sup> )	Major Str $\sigma_1$ (lb/in <sup>2</sup> )	Ratio $\sigma_1/\sigma_3$
1	95	0.00	503	0.0	0	0.0	0.0	0.0	7.00	7.00	1.00
2	148	0.09	530	2.7	6	0.6	0.4	0.4	6.40	6.83	1.07
3	207	0.19	586	8.3	10	1.0	1.3	1.3	6.00	7.31	1.22
4	260	0.28	658	15.5	13	1.3	2.4	2.4	5.70	8.14	1.43
5	314	0.37	711	20.8	15	1.5	3.3	3.3	5.50	8.77	1.59
6	372	0.47	767	26.4	17	1.7	4.1	4.1	5.30	9.45	1.78
7	426	0.56	808	30.5	20	2.0	4.8	4.6	5.00	9.63	1.93
8	480	0.65	847	34.4	21	2.1	5.4	5.2	4.90	10.13	2.07
9	538	0.75	894	39.1	23	2.3	6.1	6.0	4.70	10.66	2.27
10	593	0.84	928	42.5	24	2.4	6.6	6.5	4.60	11.09	2.41
11	648	0.93	961	45.8	25	2.5	7.2	7.0	4.50	11.50	2.56
12	706	1.03	997	49.4	26	2.6	7.7	7.6	4.40	11.96	2.72
13	760	1.12	1025	52.2	27	2.7	8.1	8.0	4.30	12.29	2.86
14	1263	1.97	1236	73.3	33	3.3	11.3	11.1	3.70	14.76	3.99
15	1883	3.02	1406	90.3	34	3.4	13.8	13.5	3.60	17.06	4.74
16	2444	3.96	1517	101.4	32	3.2	15.4	14.9	3.80	18.69	4.92
17	3067	5.02	1625	112.2	28	2.8	16.8	16.3	4.20	20.46	4.87
18	3633	5.97	1714	121.1	23	2.3	18.0	17.3	4.70	22.03	4.69
19	4258	7.03	1803	130.0	16	1.6	19.1	18.4	5.40	23.76	4.40
20	4825	7.98	1876	137.3	11	1.1	19.9	19.1	5.90	25.04	4.24
21	5449	9.04	1951	144.8	6	0.6	20.8	19.9	6.40	26.31	4.11
22	6017	9.99	2012	150.9	2	0.2	21.4	20.5	6.80	27.28	4.01
23	6584	10.95	2067	156.4	-1	-0.1	22.0	20.9	7.10	28.04	3.95
24	7212	12.01	2126	162.3	-5	-0.5	22.5	21.4	7.50	28.92	3.86
25	7778	12.97	2173	167.0	-10	-1.0	22.9	21.8	8.00	29.76	3.72
26	8409	14.03	2212	170.9	-16	-1.6	23.2	21.9	8.60	30.53	3.55
27	8976	14.99	2245	174.2	-19	-1.9	23.4	22.1	8.90	30.95	3.48
28	9545	15.95	2279	177.6	-21	-2.1	23.6	22.2	9.10	31.28	3.44
29	10174	17.01	2320	181.7	-23	-2.3	23.8	22.3	9.30	31.65	3.40
30	10745	17.97	2348	184.5	-24	-2.4	23.9	22.4	9.40	31.77	3.38
31	11351	19.00	2365	186.2	-25	-2.5	23.8	22.2	9.50	31.75	3.34
32	11958	20.02	2379	187.6	-27	-2.7	23.7	22.1	9.70	31.78	3.28



Test Method: ASTM D4767-95		Test name CU Triaxial (SS, MS) Shear (Specimen 1)	
Site Reference: C.F. Harvey		Date of Test: 12-7-16	
Jobfile: E:\16010.JOB		Sample: ST-8	
Operator: <i>mlk</i>		Borehole: L-RT-28075	
Checked: <i>mlk</i>		Approved:	



Effective Stress Triaxial Compression

Consolidated Undrained Shear (Specimen 2)

No.	Strain (divs)	Strain ε%	Load (divs)	Load (lbs)	Pore Prs (divs)	Pore Prs (lbf/in2)	D. Stress (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>m</sub> (lbf/in2)	D. Stress (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>c</sub> (lbf/in2)	Minor Str σ <sub>3</sub> ' (lbf/in2)	Major Str σ <sub>1</sub> ' (lbf/in2)	Ratio σ <sub>1</sub> '/σ <sub>3</sub> '
1	82	0.00	683	0.0	0	0.0	0.0	0.0	16.00	16.00	1.00
2	136	0.09	739	5.6	3	0.3	0.9	0.9	15.70	16.59	1.06
3	190	0.18	864	18.1	9	0.9	2.9	2.9	15.10	17.96	1.19
4	245	0.28	1028	34.5	13	1.3	5.5	5.5	14.70	20.15	1.37
5	297	0.37	1164	48.1	20	2.0	7.6	7.6	14.00	21.60	1.54
6	351	0.46	1303	62.0	25	2.5	9.8	9.8	13.50	23.28	1.72
7	409	0.56	1384	70.1	30	3.0	11.1	10.9	13.00	23.89	1.84
8	461	0.64	1453	77.0	33	3.3	12.1	12.0	12.70	24.67	1.94
9	515	0.74	1539	85.6	39	3.9	13.5	13.3	12.10	25.41	2.10
10	575	0.84	1600	91.7	46	4.6	14.4	14.3	11.40	25.66	2.25
11	626	0.92	1653	97.0	51	5.1	15.2	15.1	10.90	25.98	2.38
12	682	1.02	1720	103.7	56	5.6	16.3	16.1	10.40	26.51	2.55
13	739	1.12	1767	108.4	61	6.1	17.0	16.8	9.90	26.73	2.70
14	1239	1.96	2123	144.0	85	8.5	22.4	22.1	7.50	29.60	3.95
15	1849	3.00	2459	177.6	91	9.1	27.3	27.0	6.90	33.85	4.91
16	2409	3.95	2695	201.2	87	8.7	30.6	30.2	7.30	37.46	5.13
17	3022	4.99	2904	222.1	80	8.0	33.5	32.9	8.00	40.90	5.11
18	3641	6.04	3065	238.2	71	7.1	35.5	34.8	8.90	43.74	4.92
19	4201	6.99	3196	251.3	62	6.2	37.1	36.3	9.80	46.14	4.71
20	4766	7.95	3304	262.1	53	5.3	38.2	37.5	10.70	48.15	4.50
21	5380	9.00	3413	273.0	44	4.4	39.4	38.5	11.60	50.11	4.32
22	5946	9.96	3485	280.2	34	3.4	40.0	39.0	12.60	51.64	4.10
23	6562	11.00	3560	287.7	26	2.6	40.6	39.6	13.40	52.96	3.95
24	7129	11.97	3621	293.8	20	2.0	41.0	39.9	14.00	53.89	3.85
25	7746	13.01	3677	299.4	14	1.4	41.3	40.1	14.60	54.71	3.75
26	8314	13.98	3710	302.7	10	1.0	41.3	40.0	15.00	55.02	3.67
27	8934	15.03	3746	306.3	6	0.6	41.3	39.9	15.40	55.35	3.59
28	9501	15.99	3771	308.8	2	0.2	41.1	39.7	15.80	55.55	3.52
29	10066	16.95	3799	311.6	-2	-0.2	41.0	39.6	16.20	55.78	3.44
30	10689	18.01	3818	313.5	-6	-0.6	40.7	39.2	16.60	55.84	3.36
31	11264	18.99	3846	316.3	-7	-0.7	40.6	39.1	16.70	55.77	3.34
32	11866	20.01	3877	319.4	-9	-0.9	40.5	38.9	16.90	55.81	3.30



Test Method: ASTM D4767-95		Test name CU Triaxial (SS, MS) Shear (Specimen 2)	
Site Reference: C.F. Harvey		Date of Test: 12-7-16	
Jobfile: E:\16010.JOB		Sample: ST-8	
Operator: <i>mlk</i>		Borehole: L-RT-28075	
Checked: <i>mlk</i>		Approved:	

Effective Stress Triaxial Compression

Consolidated Undrained Shear (Specimen 3)

No.	Strain (divs)	Strain ε%	Load (divs)	Load (lbs)	Pore Prs (divs)	Pore Prs (lbf/in2)	D. Stress (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>m</sub> (lbf/in2)	D. Stress (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>c</sub> (lbf/in2)	Minor Str σ <sub>3</sub> ' (lbf/in2)	Major Str σ <sub>1</sub> ' (lbf/in2)	Ratio σ <sub>1</sub> '/σ <sub>3</sub> '
1	0	0.00	708	0.0	0	0.0	0.0	0.0	26.00	26.00	1.00
2	41	0.07	842	13.4	2	0.2	2.1	2.1	25.80	27.93	1.08
3	86	0.15	1056	34.8	5	0.5	5.5	5.5	25.50	31.04	1.22
4	136	0.24	1353	64.5	16	1.6	10.3	10.3	24.40	34.66	1.42
5	185	0.32	1628	92.0	27	2.7	14.6	14.6	23.30	37.92	1.63
6	236	0.41	1795	108.7	43	4.3	17.3	17.3	21.70	38.95	1.80
7	293	0.51	1937	122.9	54	5.4	19.5	19.3	20.60	39.93	1.94
8	345	0.60	2101	139.3	64	6.4	22.1	21.9	19.60	41.51	2.12
9	399	0.69	2212	150.4	76	7.6	23.8	23.6	18.40	42.04	2.29
10	456	0.79	2312	160.4	84	8.4	25.4	25.2	17.60	42.80	2.43
11	509	0.88	2437	172.9	91	9.1	27.3	27.2	16.90	44.05	2.61
12	561	0.97	2523	181.5	100	10.0	28.6	28.5	16.00	44.49	2.78
13	619	1.07	2607	189.9	105	10.5	29.9	29.8	15.50	45.28	2.92
14	1175	2.03	3254	254.6	134	13.4	39.8	39.5	12.60	52.07	4.13
15	1735	3.00	3596	288.8	133	13.3	44.6	44.3	12.70	56.99	4.49
16	2302	3.98	3816	310.8	125	12.5	47.6	47.1	13.50	60.58	4.49
17	2866	4.95	3979	327.1	114	11.4	49.5	49.0	14.60	63.59	4.36
18	3488	6.03	4105	339.7	100	10.0	50.9	50.2	16.00	66.24	4.14
19	4053	7.01	4205	349.7	89	8.9	51.8	51.1	17.10	68.21	3.99
20	4624	7.99	4294	358.6	82	8.2	52.6	51.8	17.80	69.59	3.91
21	5191	8.97	4369	366.1	76	7.6	53.1	52.2	18.40	70.63	3.84
22	5756	9.95	4433	372.5	70	7.0	53.5	52.5	19.00	71.50	3.76
23	6384	11.04	4499	379.1	65	6.5	53.8	52.7	19.50	72.22	3.70
24	6950	12.01	4546	383.8	59	5.9	53.8	52.7	20.10	72.80	3.62
25	7524	13.01	4599	389.1	54	5.4	53.9	52.8	20.60	73.37	3.56
26	8092	13.99	4641	393.3	50	5.0	53.9	52.7	21.00	73.66	3.51
27	8661	14.97	4677	396.9	48	4.8	53.8	52.5	21.20	73.67	3.48
28	9232	15.96	4719	401.1	47	4.7	53.7	52.3	21.30	73.65	3.46
29	9858	17.04	4756	404.8	46	4.6	53.5	52.1	21.40	73.47	3.43
30	10433	18.04	4789	408.1	44	4.4	53.3	51.8	21.60	73.40	3.40
31	10996	19.01	4811	410.3	43	4.3	53.0	51.4	21.70	73.11	3.37
32	11561	19.99	4862	415.4	41	4.1	53.0	51.4	21.90	73.28	3.35

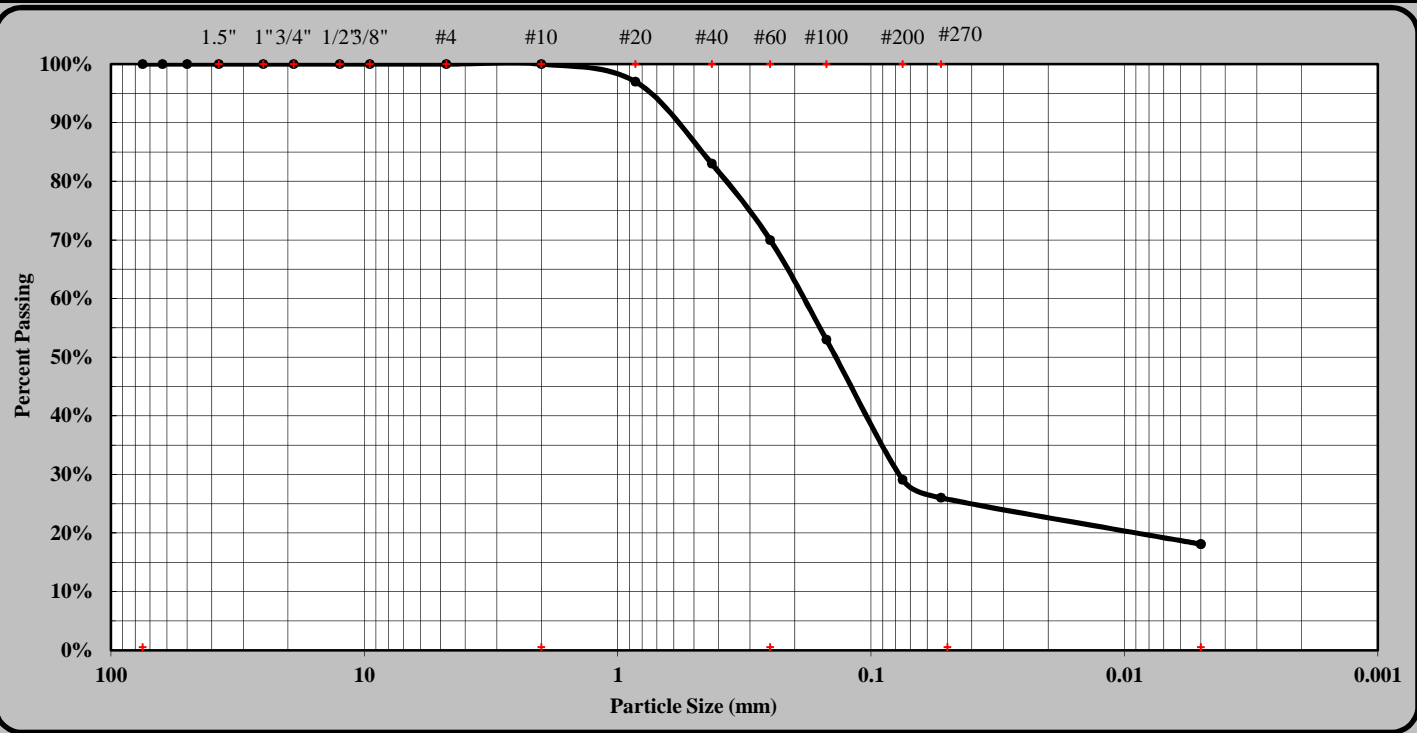


Test Method: ASTM D4767-95		Test name CU Triaxial (SS, MS) Shear (Specimen 3)	
Site Reference: C.F. Harvey		Date of Test: 12-7-16	
Jobfile: E:\16010.JOB		Sample: ST-8	
Operator: <i>mlk</i>		Borehole: L-RT-28075	
Checked: <i>mlk</i>		Approved:	



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/8/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/1-8/16
State Project #:	46375.1.1	F.A. Project No:	N/A
		TIP NO:	R-5703
Client Name:	Michael Baker Engineering		
Address:	Raleigh, NC		
Boring #:	L-RT-28181	Sample #:	SS-66
		Sample Date:	9/12/16
Location:	281+81	Offset:	38' RT
		Depth (ft):	0.5-2.0'
Sample Description:	Silty SAND A-2-4 (0)		



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#20	Coarse Sand	30%	Silt	8%
Gravel	0%	Fine Sand	44%	Clay	18%
Apparent Relative Density	2.650	Moisture Content	22.1%	% Passing #200	29.1%
Liquid Limit	21	Plastic Limit	14	Plastic Index	7
Soil Mortar (-#10 Sieve)					
Coarse Sand	30%	Fine Sand	44%	Silt	8%
				Clay	18%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>		Angular	<input checked="" type="checkbox"/>
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input checked="" type="checkbox"/>	Weathered & Friable	<input checked="" type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

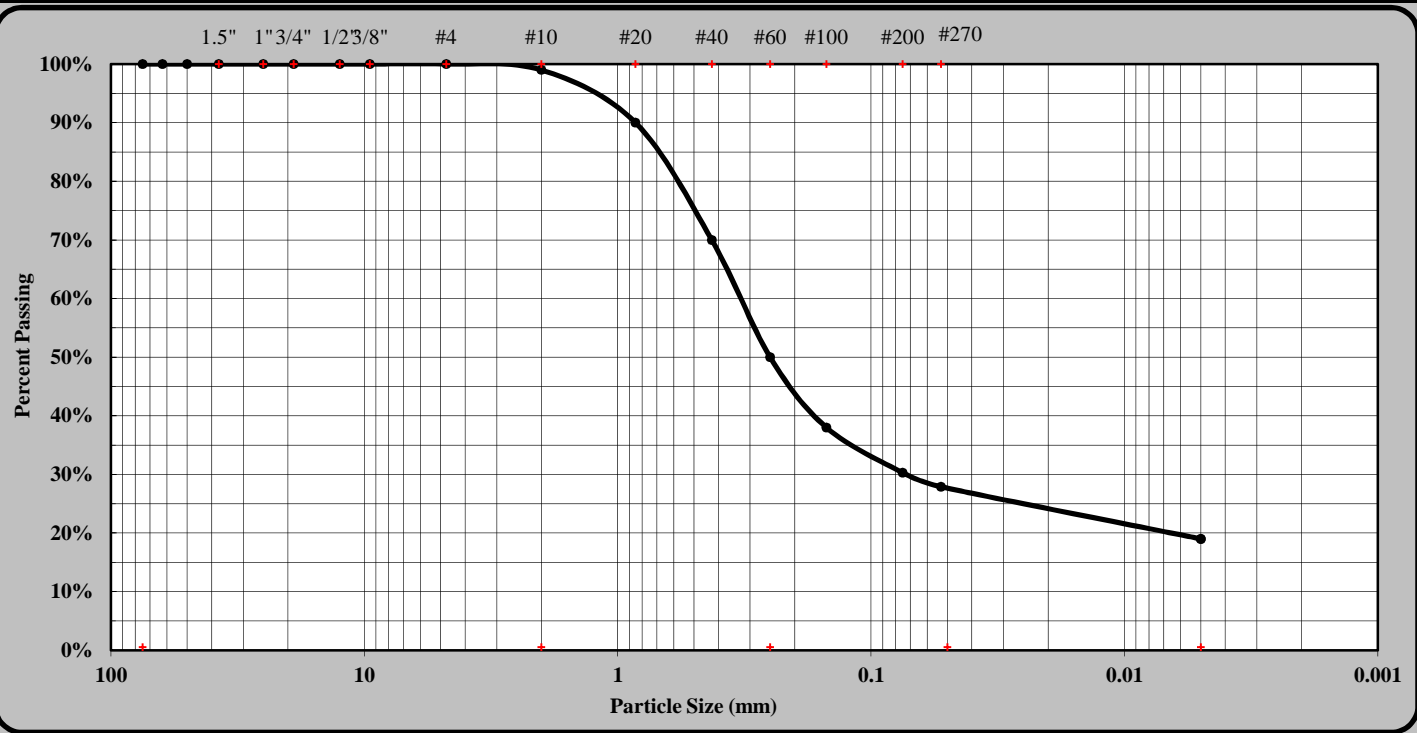
<u>Karen Warner</u> Technician Name	<u>118-06-0305</u> Certification No.	<u>Laboratory Technician</u> Position	<u>11/8/2016</u> Date
<u>Stewart Laney, P.E</u> Technical Responsibility	_____ Signature	<u>Senior Engineer</u> Position	_____ Date

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Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/8/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/1-8/16
State Project #:	46375.1.1	F.A. Project No:	N/A
		TIP NO:	R-5703
Client Name:	Michael Baker Engineering		
Address:	Raleigh, NC		
Boring #:	L-RT-28181	Sample #:	SS-67
		Sample Date:	9/12/16
Location:	281+81	Offset:	38' RT
		Depth (ft):	32.2-33.7'
Sample Description:	Clayey SAND A-2-6 (1)		



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#10	Coarse Sand	49%	Silt	9%
Gravel	1%	Fine Sand	22%	Clay	19%
Apparent Relative Density	2.650	Moisture Content	17.9%	% Passing #200	30.3%
Liquid Limit	31	Plastic Limit	13	Plastic Index	18
Soil Mortar (-#10 Sieve)					
Coarse Sand	49%	Fine Sand	23%	Silt	9%
				Clay	19%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>		Angular	<input checked="" type="checkbox"/>
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>


References / Comments / Deviations: ND=Not Determined.

<u>Karen Warner</u> Technician Name	<u>118-06-0305</u> Certification No.	<u>Laboratory Technician</u> Position	<u>11/8/2016</u> Date
<u>Stewart Laney, P.E</u> Technical Responsibility	_____ Signature	<u>Senior Engineer</u> Position	_____ Date

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Form No. TR-T88  
Revision No. 0  
Revision Date: 12/20/09

Particle Size Analysis of Soils  
AASHTO T88 as Modified by NCDOT



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 12/27/16

Project Name: C.F. Harvey Parkway Extension R-5703Test Date(s): 12/24 - 12/27/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

Client Name: Michael Baker Engineering

Address: Raleigh, NC

Boring #: L-28694Sample #: ST-9Sample Date: 9/21/16

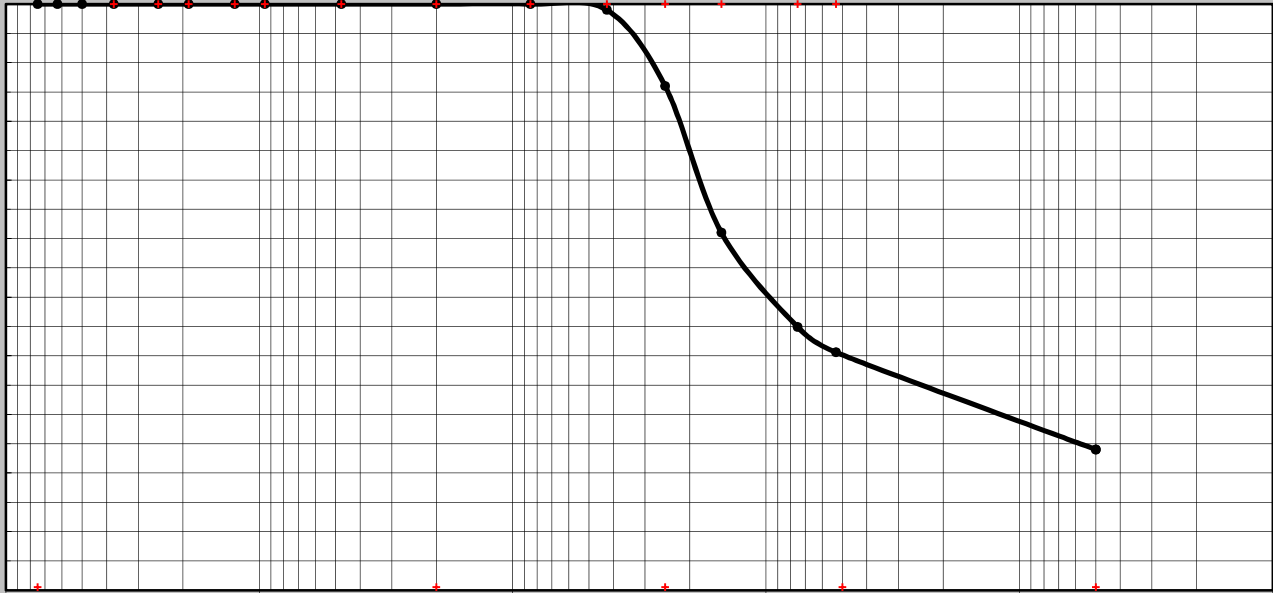
Location: 286+94Offset: 15' RTDepth (ft): 4.1 - 6.0 ft.

Sample Description: Tan-Gray Coarse to Fine Sandy Silty CLAY A-6 (2)

Percent Passing

100%  
90%  
80%  
70%  
60%  
50%  
40%  
30%  
20%  
10%  
0%

1.5" 1"3/4" 1/23/8" #4 #10 #20 #40 #60 #100 #200 #270



Particle Size (mm)

As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	

Maximum Particle Size	#4	Coarse Sand	14%	Silt	17%
Gravel	0%	Fine Sand	45%	Clay	24%
Apparent Relative Density	ND	Moisture Content	20.9%	% Passing #200	44.9%
Liquid Limit	28	Plastic Limit	15	Plastic Index	13

Soil Mortar (-#10 Sieve)

Coarse Sand	14%	Fine Sand	45%	Silt	17%	Clay	24%
-------------	-----	-----------	-----	------	-----	------	-----

Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>	
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

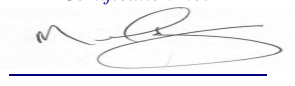
Position

12/27/2016

Date

Mal Krajan, ET

Technical Responsibility



Signature

Laboratory Manager

Position

9/26/2016


Date

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Oedometer Settlement Tests

Sample details

Sketch showing specimen location in original Sample



Depth

Description:

4.1 - 6.0 ft.

Tan-Gray Coarse to Fine Sandy Silty CLAY (A-6) (2)

Type

Height H<sub>0</sub> (in)

Diameter D<sub>0</sub> (in)

Weight W<sub>0</sub> (gr)

Bulk Density ρ (PCF)

Particle Density ρ<sub>s</sub>

Undisturbed

0.999

2.501

158.18

122.78

2.663 (measured)

Initial Conditions

Settlement Channel

Moisture Content w<sub>0</sub> %

Dry Density ρ<sub>d</sub> (PCF)

Voids Ratio e<sub>0</sub>

Deg of Saturation S<sub>0</sub> %

Swelling Pressure S<sub>s</sub> (TSF)

1066

20.9

101.58

0.6359

87.4

0.000

Final Conditions

Moisture Content w<sub>f</sub> %

Dry Density ρ<sub>d</sub> (PCF)

Voids Ratio e<sub>f</sub>

Deg of Saturation S<sub>f</sub> %

Settlement: (in)

Compression Index C<sub>c</sub>

23.2

106.09

0.5663


100.00

0.043

0.129

Notes:

Test specimen taken from the middle portion of UD tube.



ASTM D2435-96

Test name

Date of Test:

Consolidation

11-30-16

Site Reference:

Jobfile:

Operator:

C.F. Harvey

E:\16010.JOB

MLC

Sample:

Borehole:

ST-9

L-28694

Checked:

MLC

Approved:

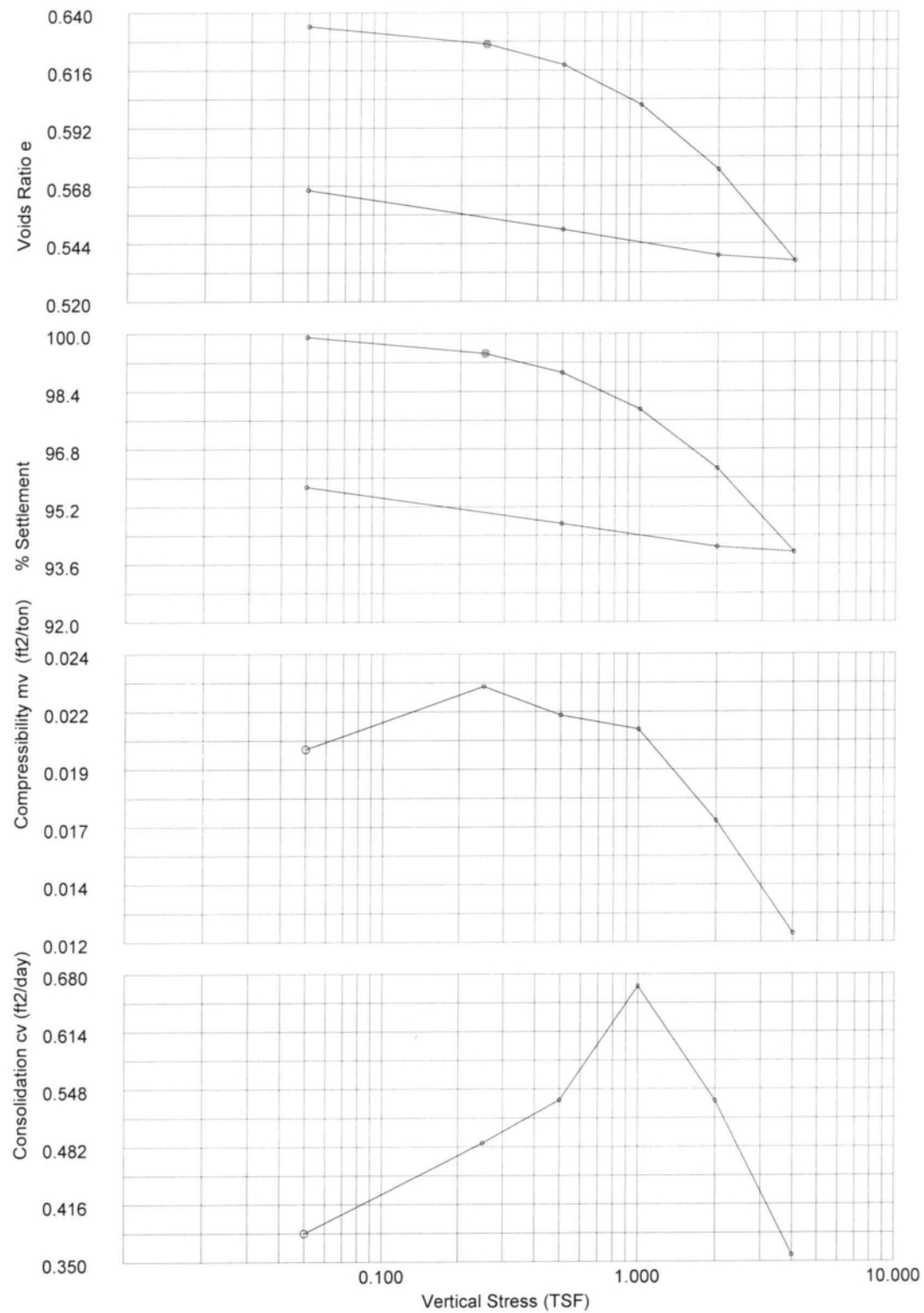
S&ME, Inc.

3201 Spring Forest Road  
Raleigh, NC 27616

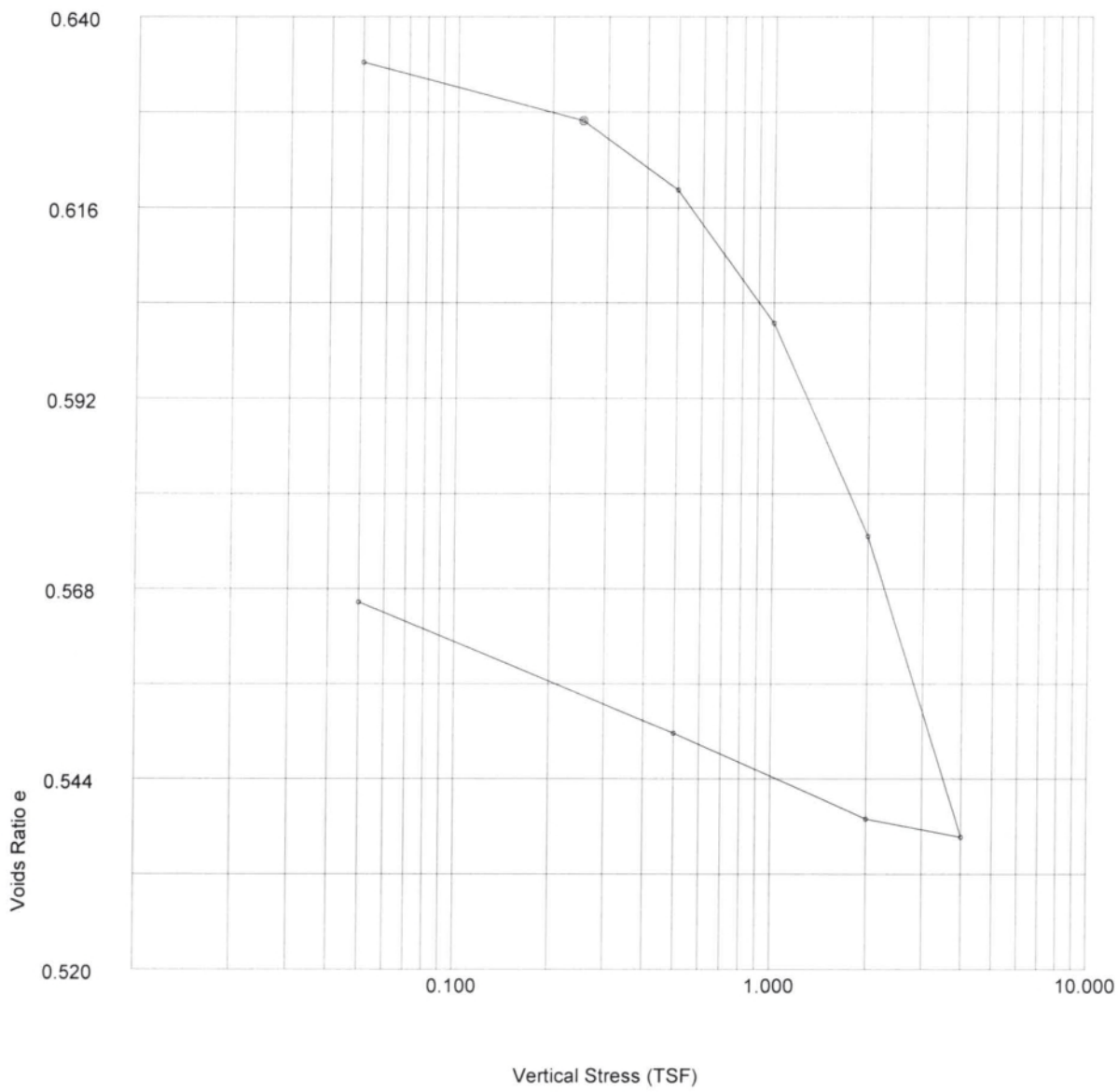
48a.L-28694 ST-9 (4.1 - 6.0 ft) Classification.xls



Oedometer Settlement Tests



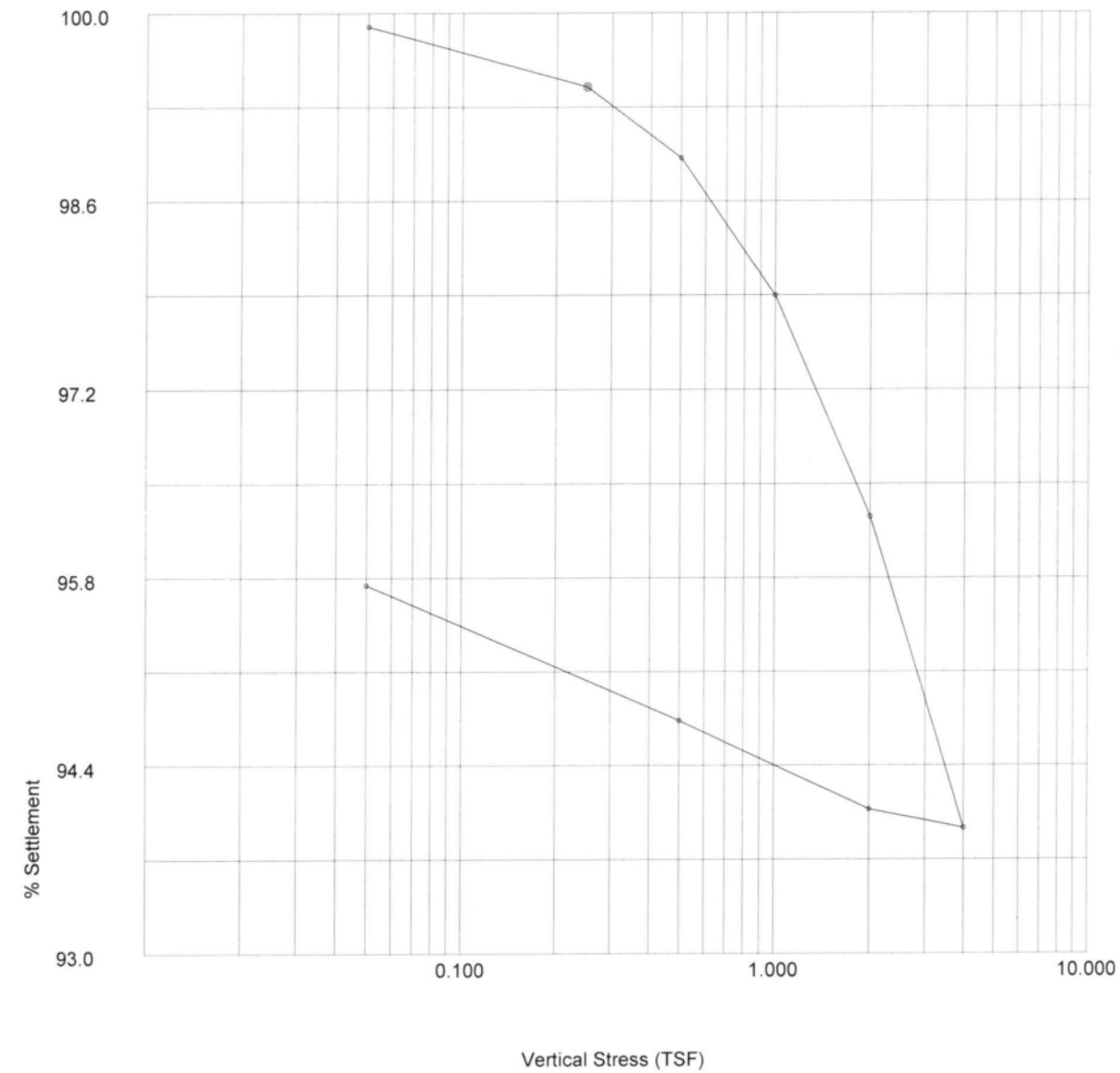
Oedometer Settlement Tests



	ASTM D2435-96		Test name	Consolidation
	Site Reference: C.F. Harvey		Date of Test:	11-30-16
	Jobfile: E:\16010.JOB		Sample:	ST-9
	Operator: <i>MLK</i>		Borehole:	L-28694
	Checked: <i>MLK</i>		Approved:	

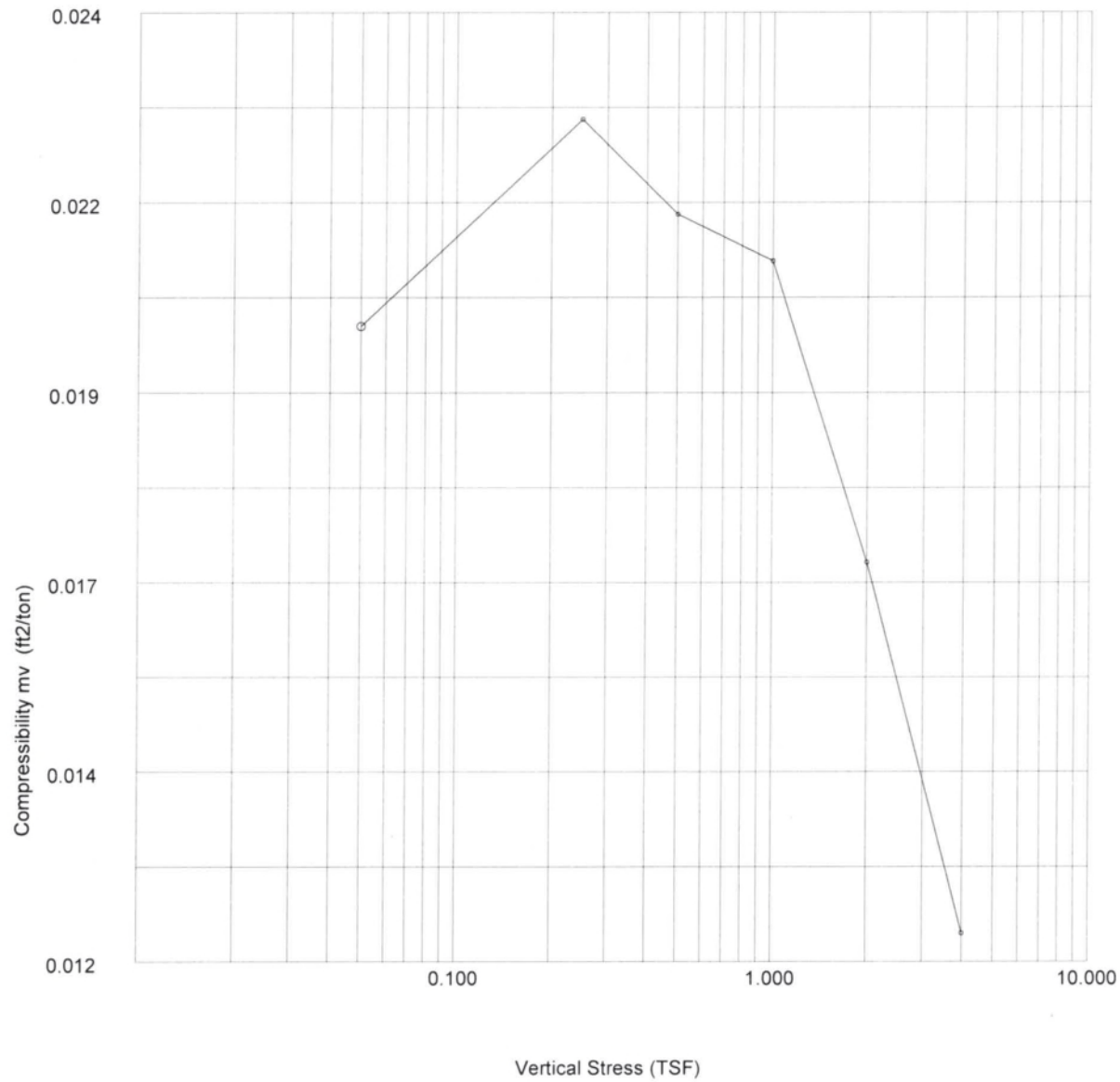
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	Site Reference: C.F. Harvey		Date of Test:	11-30-16
	Jobfile: E:\16010.JOB		Sample:	ST-9
	Operator: <i>MLK</i>		Borehole:	L-28694
	Checked: <i>MLK</i>		Approved:	

Oedometer Settlement Tests



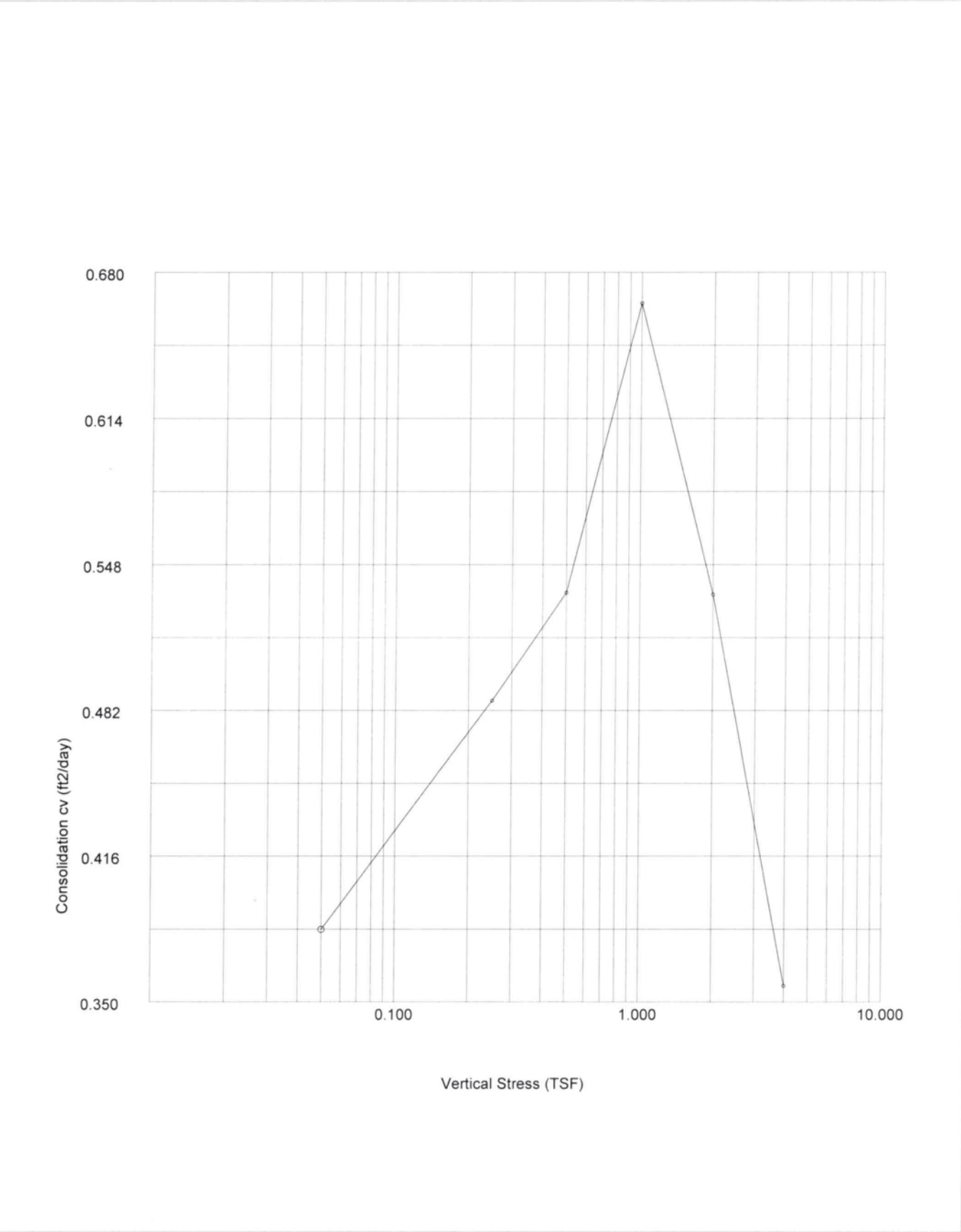
	ASTM D2435-96		Test name	Consolidation
	Site Reference: C.F. Harvey		Date of Test:	11-30-16
	Jobfile:	E:\16010.JOB	Sample:	ST-9
	Operator: <i>mk</i>	Checked: <i>mk</i>	Borehole:	L-28694
			Approved:	

Oedometer Settlement Tests



	ASTM D2435-96		Test name	Consolidation
	Site Reference: C.F. Harvey		Date of Test:	11-30-16
	Jobfile:	E:\16010.JOB	Sample:	ST-9
	Operator: <i>mk</i>	Checked: <i>mk</i>	Borehole:	L-28694
			Approved:	

Oedometer Settlement Tests



	ASTM D2435-96		Test name Consolidation		
			Date of Test: 11-30-16		
	Site Reference: C.F. Harvey		Sample: ST-9		
	Jobfile: E:\16010.JOB		Borehole: L-28694		
Operator: <i>MLK</i>		Checked: <i>MLK</i>		Approved:	

Oedometer Settlement Tests

Stress (TSF)	Initial Temp. oC	Settlement Total (in)	Cal Corr. (in)	Final Temp. oC	Voids Ratio e <sub>f</sub>	t <sub>50</sub> (mins)	Secondary Compr C <sub>sec</sub>	c <sub>v</sub> (ft2/day)	m <sub>v</sub> (ft2/ton)
0.050	21.6	0.0010	0.0	21.6	0.6343	1.302	0.00	0.383	0.020
0.250	21.6	0.0055	0.0	21.6	0.6269	1.019	0.0003	0.486	0.023
0.500	21.6	0.0108	0.0	21.6	0.6182	0.917	0.0003	0.535	0.021
1.000	21.6	0.0210	0.0	21.6	0.6015	0.726	0.0032	0.666	0.021
2.000	21.6	0.0374	0.0	21.6	0.5747	0.880	0.0004	0.534	0.017
4.000	21.6	0.0606	0.0	21.6	0.5367	1.263	0.0017	0.357	0.012
2.000	21.6	0.0592	0.0	21.6	0.5390				0.001
0.500	21.6	0.0526	0.0	21.6	0.5498				0.005
0.050	21.6	0.0425	0.0	21.6	0.5663				0.023

	ASTM D2435-96		Test name Consolidation		
			Date of Test: 11-30-16		
	Site Reference: C.F. Harvey		Sample: ST-9		
	Jobfile: E:\16010.JOB		Borehole: L-28694		
Operator: <i>MLK</i>		Checked: <i>MLK</i>		Approved:	

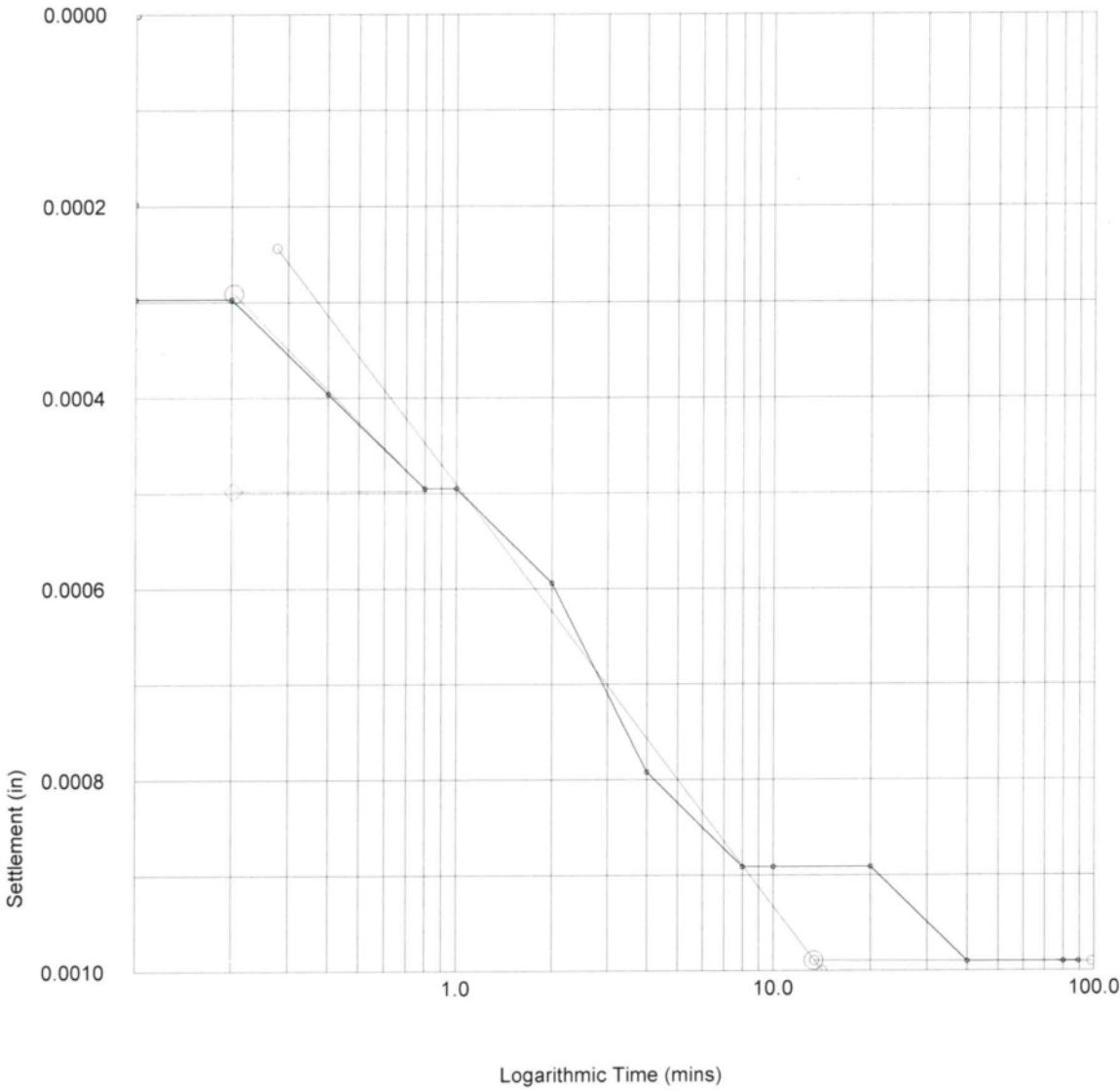
Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	0	0.0000	0.0000
2	0.017	2	0.0002	0.0002
3	0.033	2	0.0002	0.0002
4	0.050	2	0.0002	0.0002
5	0.067	3	0.0003	0.0003
6	0.083	3	0.0003	0.0003
7	0.100	3	0.0003	0.0003
8	0.200	3	0.0003	0.0003
9	0.400	4	0.0004	0.0004
10	0.800	5	0.0005	0.0005
11	1.000	5	0.0005	0.0005
12	2.000	6	0.0006	0.0006
13	4.000	8	0.0008	0.0008
14	8.000	9	0.0009	0.0009
15	10.000	9	0.0009	0.0009
16	20.000	9	0.0009	0.0009
17	40.000	10	0.0010	0.0010
18	80.000	10	0.0010	0.0010
19	89.470	10	0.0010	0.0010

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.050
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.001
Voids Ratio e	0.6343
Final Temp oC	0.0
t <sub>50</sub> (mins)	1.30
c <sub>v</sub> (ft <sup>2</sup> /day)	0.383
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.02
Sec Compression C <sub>sec</sub>	0.00



	ASTM D2435-96		Test name Consolidation Load: 0.050 (TSF)	
	Site Reference: C.F. Harvey		Date of Test: 11-30-16	
	Jobfile: E:\16010.JOB		Sample: ST-9	
	Borehole: L-28694		Operator: <i>ML</i>	
Checked: <i>ML</i>		Approved:		

	ASTM D2435-96		Test name Consolidation	
	Site Reference: C.F. Harvey		Date of Test: 11-30-16	
	Jobfile: E:\16010.JOB		Sample: ST-9	
	Borehole: L-28694		Operator: <i>ML</i>	
Checked: <i>ML</i>		Approved:		



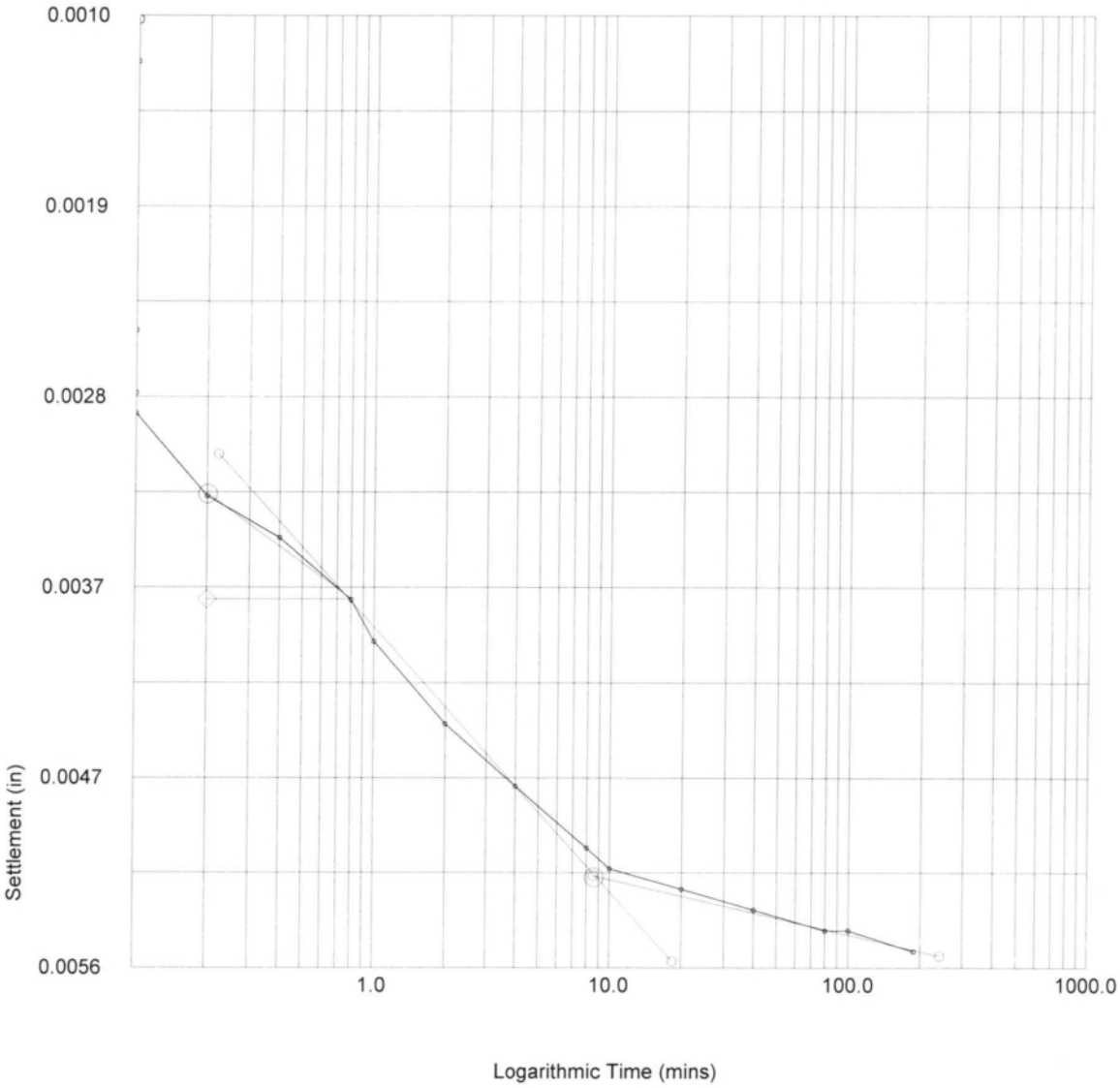
Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	10	0.0010	0.0010
2	0.017	12	0.0012	0.0012
3	0.033	25	0.0025	0.0025
4	0.050	28	0.0028	0.0028
5	0.067	28	0.0028	0.0028
6	0.083	29	0.0029	0.0029
7	0.100	29	0.0029	0.0029
8	0.200	33	0.0033	0.0033
9	0.400	35	0.0035	0.0035
10	0.800	38	0.0038	0.0038
11	1.000	40	0.0040	0.0040
12	2.000	44	0.0044	0.0044
13	4.000	47	0.0047	0.0047
14	8.000	50	0.0050	0.0050
15	10.000	51	0.0051	0.0051
16	20.000	52	0.0052	0.0052
17	40.000	53	0.0053	0.0053
18	80.000	54	0.0054	0.0054
19	100.000	54	0.0054	0.0054
20	187.770	55	0.0055	0.0055

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.250
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0045
Voids Ratio e	0.6269
Final Temp oC	0.0
t <sub>50</sub> (mins)	1.02
c <sub>v</sub> (ft <sup>2</sup> /day)	0.486
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.023
Sec Compression C <sub>sec</sub>	0.0003



ASTM D2435-96	Test name	Consolidation	Load: 0.250 (TSF)
Site Reference: C.F. Harvey	Date of Test:	11-30-16	
Jobfile: E:\16010.JOB	Sample:	ST-9	
Operator: <i>mk</i>	Borehole:	L-28694	
Checked: <i>mk</i>	Approved:		



ASTM D2435-96	Test name	Consolidation	
Site Reference: C.F. Harvey	Date of Test:	11-30-16	
Jobfile: E:\16010.JOB	Sample:	ST-9	
Operator: <i>mk</i>	Borehole:	L-28694	
Checked: <i>mk</i>	Approved:		

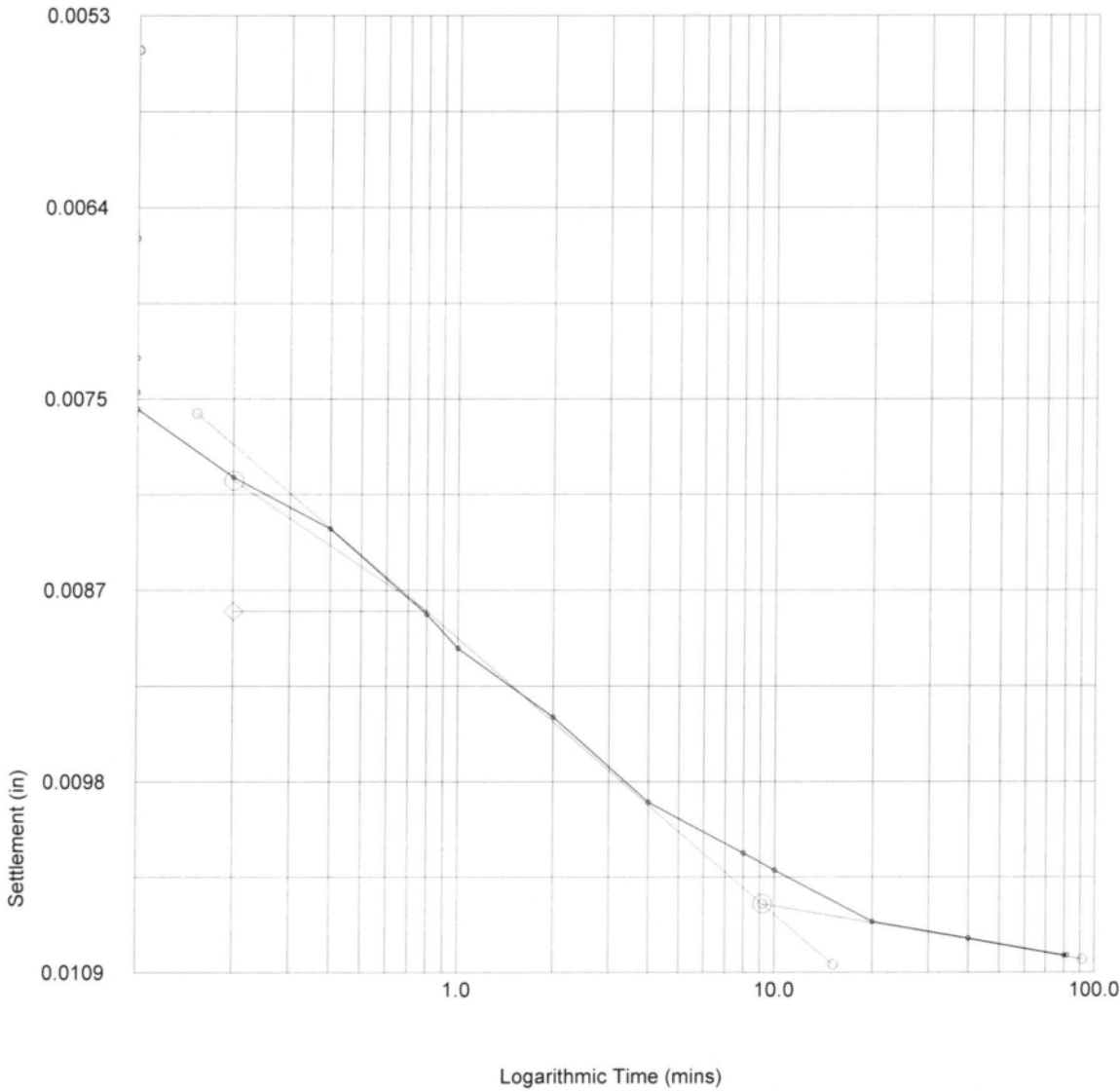
Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	55	0.0055	0.0055
2	0.017	66	0.0066	0.0066
3	0.033	66	0.0066	0.0066
4	0.050	73	0.0073	0.0073
5	0.067	75	0.0075	0.0075
6	0.083	76	0.0076	0.0076
7	0.100	76	0.0076	0.0076
8	0.200	80	0.0080	0.0080
9	0.400	83	0.0083	0.0083
10	0.800	88	0.0088	0.0088
11	1.000	90	0.0090	0.0090
12	2.000	94	0.0094	0.0094
13	4.000	99	0.0099	0.0099
14	8.000	102	0.0102	0.0102
15	10.000	103	0.0103	0.0103
16	20.000	106	0.0106	0.0106
17	40.000	107	0.0107	0.0107
18	80.000	108	0.0108	0.0108
19	81.633	108	0.0108	0.0108

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.500
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0053
Voids Ratio e	0.6182
Final Temp oC	0.0
t <sub>50</sub> (mins)	0.92
c <sub>v</sub> (ft <sup>2</sup> /day)	0.535
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.021
Sec Compression C <sub>sec</sub>	0.0003



	ASTM D2435-96		Test name Consolidation Load: 0.500 (TSF)	
	Site Reference: C.F. Harvey		Date of Test: 11-30-16	
	Jobfile: E:\16010.JOB		Sample: ST-9	
	Operator: <i>mk</i>		Borehole: L-28694	
	Checked: <i>mk</i>		Approved:	

	ASTM D2435-96		Test name Consolidation	
	Site Reference: C.F. Harvey		Date of Test: 11-30-16	
	Jobfile: E:\16010.JOB		Sample: ST-9	
	Operator: <i>mk</i>		Borehole: L-28694	
	Checked: <i>mk</i>		Approved:	

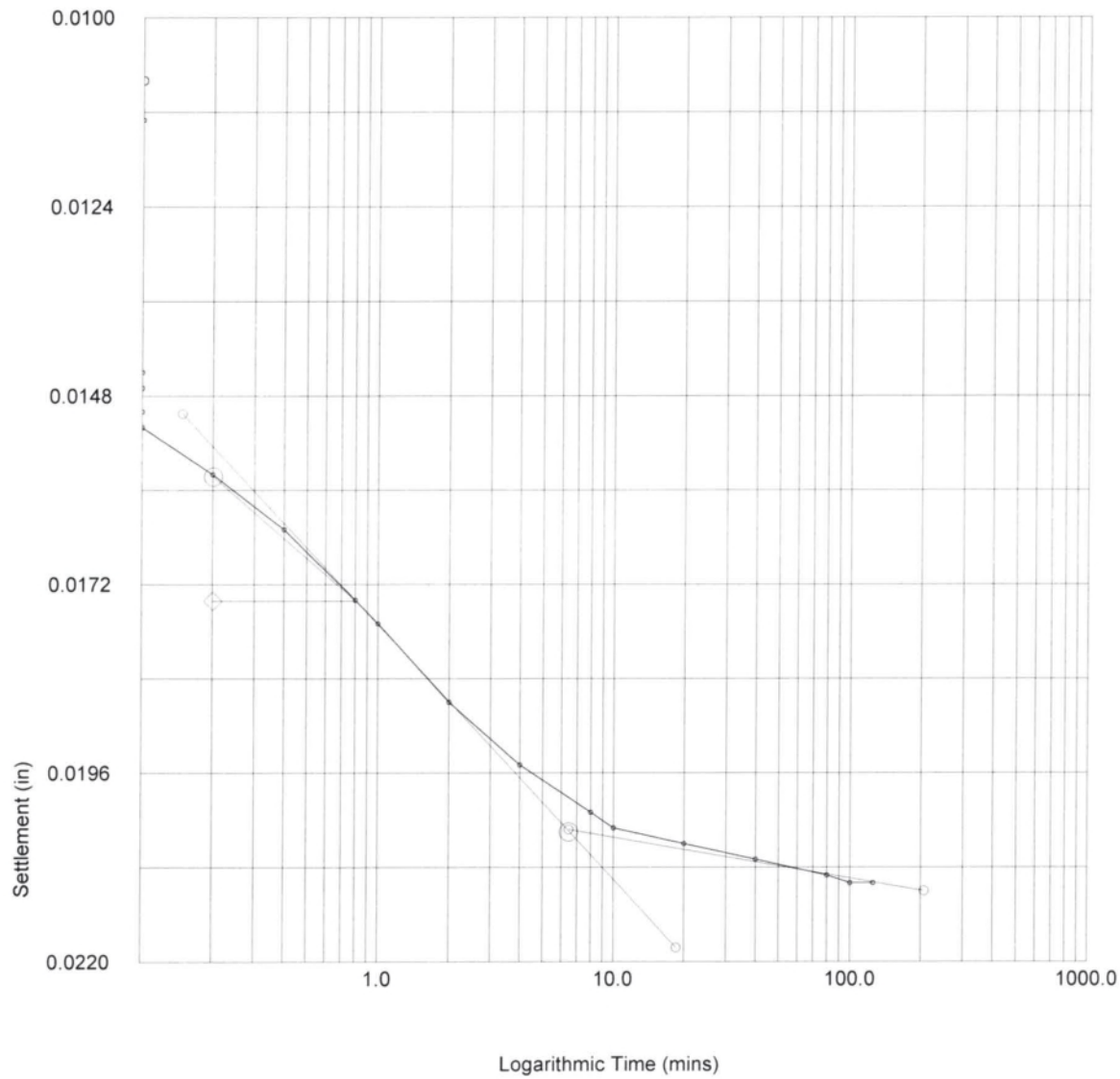
Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	108	0.0108	0.0108
2	0.017	113	0.0113	0.0113
3	0.033	113	0.0113	0.0113
4	0.050	145	0.0145	0.0145
5	0.067	147	0.0147	0.0147
6	0.083	150	0.0150	0.0150
7	0.100	152	0.0152	0.0152
8	0.200	158	0.0158	0.0158
9	0.400	165	0.0165	0.0165
10	0.800	174	0.0174	0.0174
11	1.000	177	0.0177	0.0177
12	2.000	187	0.0187	0.0187
13	4.000	195	0.0195	0.0195
14	8.000	201	0.0201	0.0201
15	10.000	203	0.0203	0.0203
16	20.000	205	0.0205	0.0205
17	40.000	207	0.0207	0.0207
18	80.000	209	0.0209	0.0209
19	100.000	210	0.0210	0.0210
20	125.533	210	0.0210	0.0210

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	1.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0102
Voids Ratio e	0.6015
Final Temp oC	0.0
t <sub>50</sub> (mins)	0.73
c <sub>v</sub> (ft <sup>2</sup> /day)	0.666
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.021
Sec Compression C <sub>sec</sub>	0.0032



	ASTM D2435-96		Test name	Consolidation Load: 1.000 (TSF)
			Date of Test:	11-30-16
	Site Reference:	C.F. Harvey	Sample:	ST-9
	Jobfile:	E:\16010.JOB	Borehole:	L-28694
Operator: <i>mlk</i>		Checked: <i>mlk</i>	Approved:	

	ASTM D2435-96		Test name	Consolidation
			Date of Test:	11-30-16
	Site Reference:	C.F. Harvey	Sample:	ST-9
	Jobfile:	E:\16010.JOB	Borehole:	L-28694
Operator: <i>mlk</i>		Checked: <i>mlk</i>	Approved:	



Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	210	0.0210	0.0210
2	0.017	222	0.0222	0.0222
3	0.033	232	0.0232	0.0232
4	0.050	236	0.0236	0.0236
5	0.067	246	0.0246	0.0246
6	0.083	256	0.0256	0.0256
7	0.100	280	0.0280	0.0280
8	0.200	287	0.0287	0.0287
9	0.400	298	0.0298	0.0298
10	0.800	313	0.0313	0.0313
11	1.000	318	0.0318	0.0318
12	2.000	334	0.0334	0.0334
13	4.000	348	0.0348	0.0348
14	8.000	357	0.0357	0.0357
15	10.000	360	0.0360	0.0360
16	20.000	364	0.0364	0.0364
17	40.000	367	0.0367	0.0367
18	80.000	370	0.0370	0.0370
19	100.000	370	0.0370	0.0370
20	200.000	372	0.0372	0.0372
21	400.000	373	0.0373	0.0373
22	800.000	374	0.0374	0.0374
23	908.933	374	0.0374	0.0374

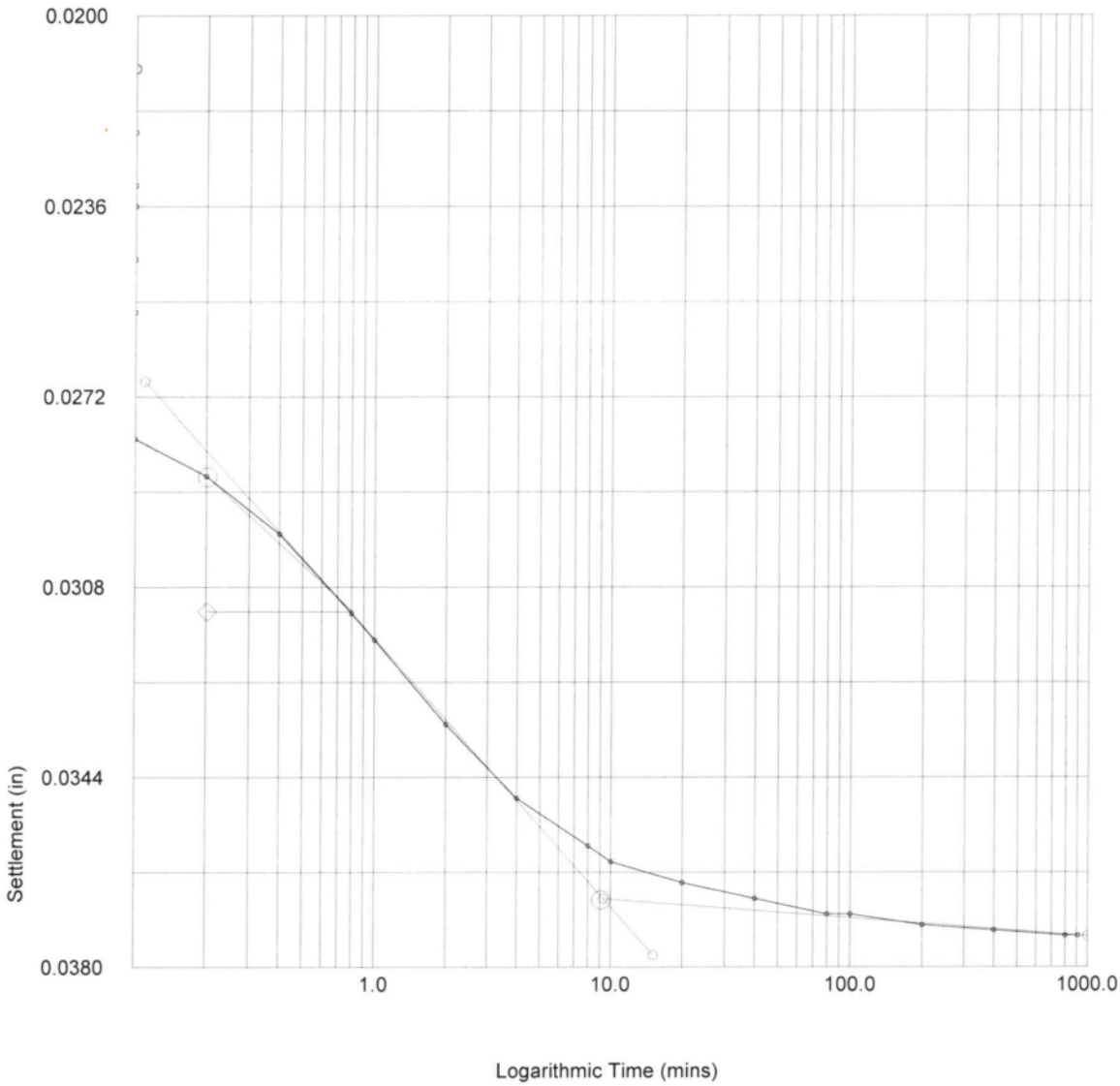


ASTM D2435-96		Test name	Consolidation Load: 2.000 (TSF)
Site Reference: C.F. Harvey		Date of Test:	11-30-16
Jobfile: E:\16010.JOB		Sample:	ST-9
Operator: <i>MLC</i>		Borehole:	L-28694
Checked: <i>MLC</i>		Approved:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	2.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0164
Voids Ratio e	0.5747
Final Temp oC	0.0
t <sub>50</sub> (mins)	0.88
c <sub>v</sub> (ft <sup>2</sup> /day)	0.534
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.017
Sec Compression C <sub>sec</sub>	0.0004



ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	11-30-16
Jobfile: E:\16010.JOB		Sample:	ST-9
Operator: <i>MLC</i>		Borehole:	L-28694
Checked: <i>MLC</i>		Approved:	



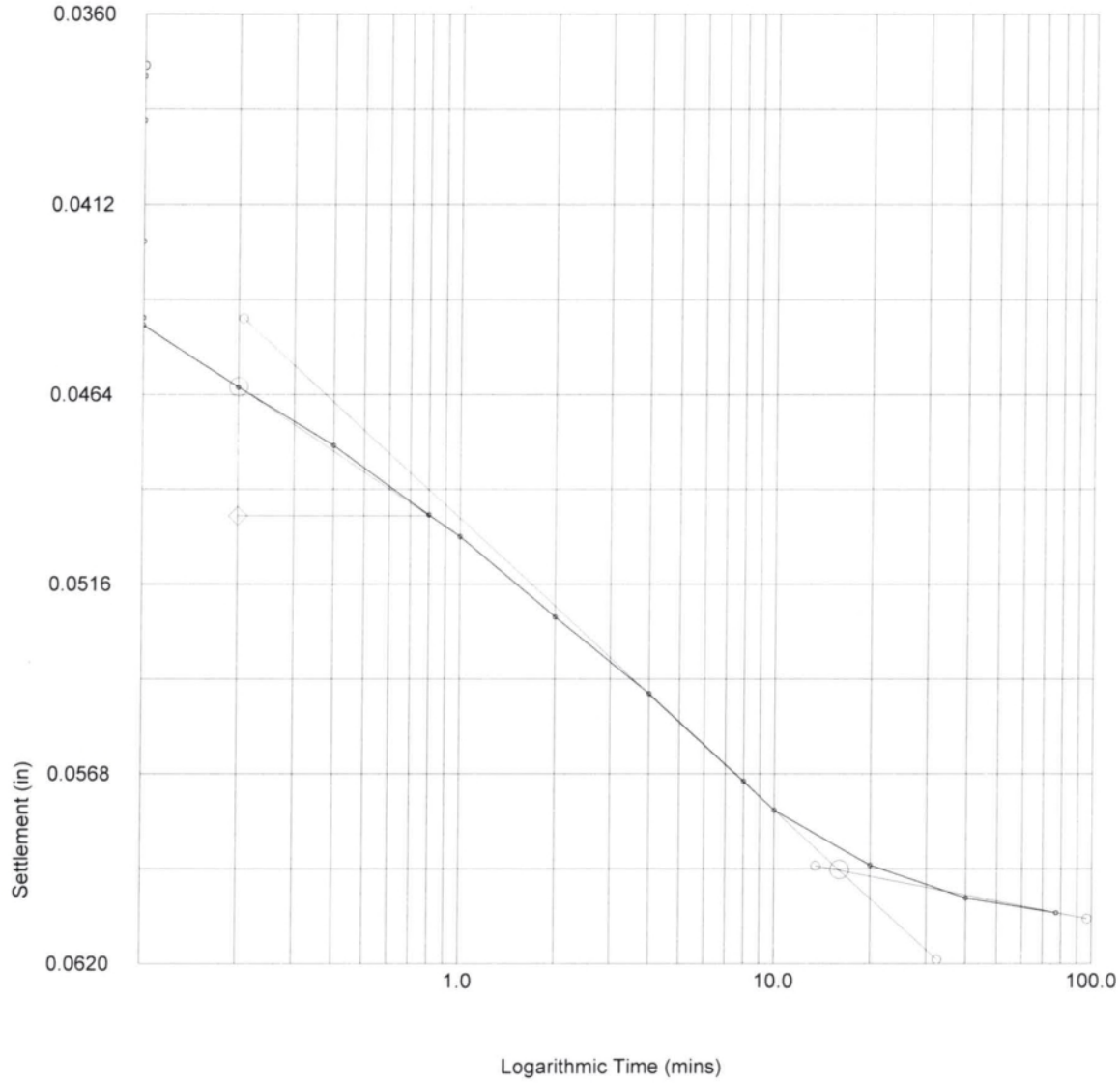
Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	374	0.0374	0.0374
2	0.017	377	0.0377	0.0377
3	0.033	377	0.0377	0.0377
4	0.050	389	0.0389	0.0389
5	0.067	422	0.0422	0.0422
6	0.083	443	0.0443	0.0443
7	0.100	445	0.0445	0.0445
8	0.200	462	0.0462	0.0462
9	0.400	478	0.0478	0.0478
10	0.800	497	0.0497	0.0497
11	1.000	503	0.0503	0.0503
12	2.000	525	0.0525	0.0525
13	4.000	546	0.0546	0.0546
14	8.000	570	0.0570	0.0570
15	10.000	578	0.0578	0.0578
16	20.000	593	0.0593	0.0593
17	40.000	602	0.0602	0.0602
18	77.150	606	0.0606	0.0606

	ASTM D2435-96		Test name	Consolidation Load: 4.000 (TSF)
			Date of Test:	11-30-16
	Site Reference:	C.F. Harvey	Sample:	ST-9
	Jobfile:	E:\16010.JOB	Borehole:	L-28694
Operator: <i>MLK</i>		Checked: <i>MLK</i>	Approved:	

Oedometer Settlement Tests

Settlement Stage Results	
Vertical Stress (TSF)	4.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0232
Voids Ratio e	0.5367
Final Temp oC	0.0
t <sub>50</sub> (mins)	1.26
c <sub>v</sub> (ft <sup>2</sup> /day)	0.357
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.012
Sec Compression C <sub>sec</sub>	0.0017



	ASTM D2435-96		Test name	Consolidation
			Date of Test:	11-30-16
	Site Reference:	C.F. Harvey	Sample:	ST-9
	Jobfile:	E:\16010.JOB	Borehole:	L-28694
Operator: <i>MLK</i>		Checked: <i>MLK</i>	Approved:	

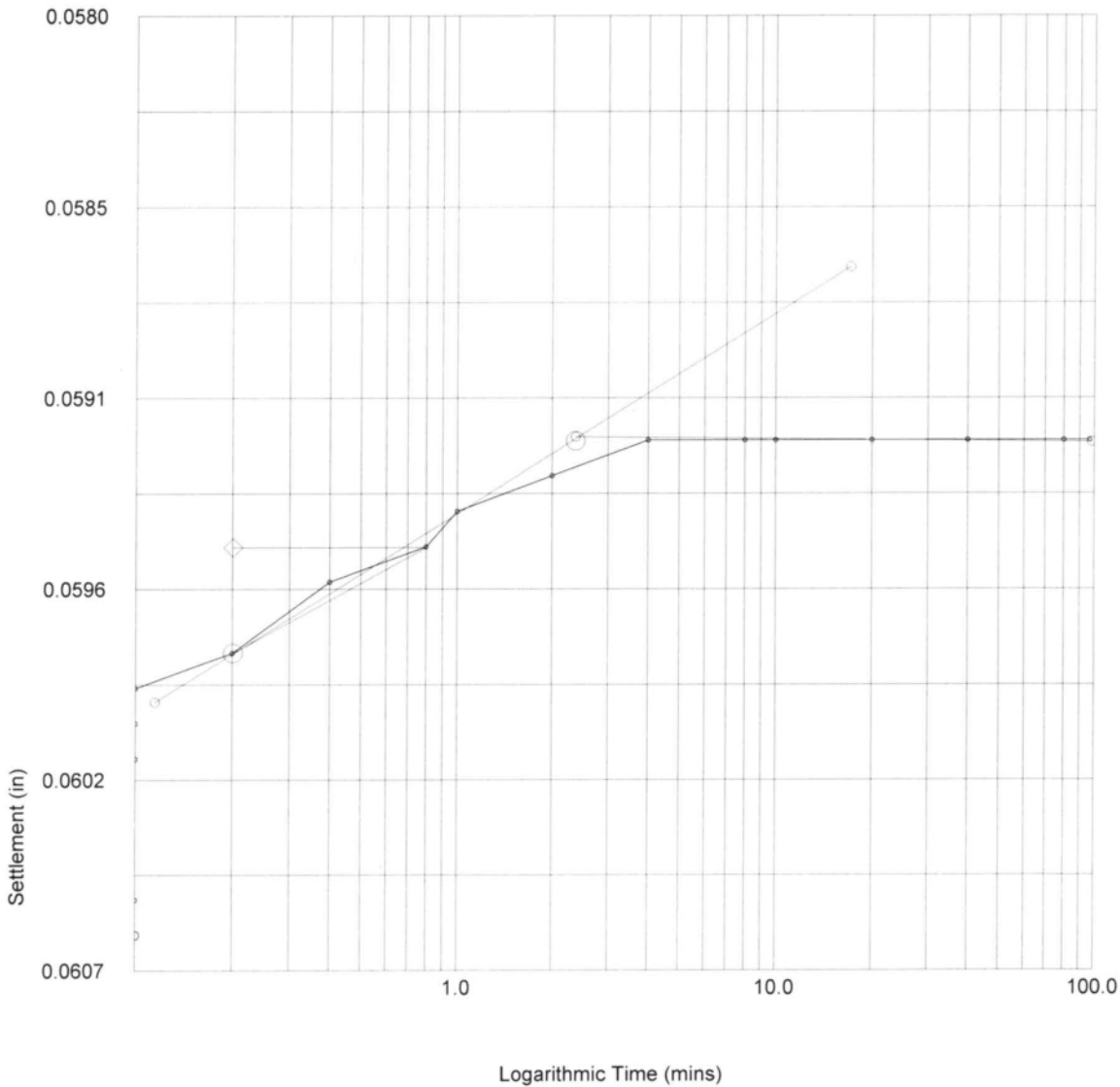
Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	606	0.0606	0.0606
2	0.017	605	0.0605	0.0605
3	0.033	601	0.0601	0.0601
4	0.050	600	0.0600	0.0600
5	0.067	600	0.0600	0.0600
6	0.083	599	0.0599	0.0599
7	0.100	599	0.0599	0.0599
8	0.200	598	0.0598	0.0598
9	0.400	596	0.0596	0.0596
10	0.800	595	0.0595	0.0595
11	1.000	594	0.0594	0.0594
12	2.000	593	0.0593	0.0593
13	4.000	592	0.0592	0.0592
14	8.000	592	0.0592	0.0592
15	10.000	592	0.0592	0.0592
16	20.000	592	0.0592	0.0592
17	40.000	592	0.0592	0.0592
18	80.000	592	0.0592	0.0592
19	96.660	592	0.0592	0.0592

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	2.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0014
Voids Ratio e	0.5390
Final Temp oC	
t <sub>50</sub> (mins)	
c <sub>v</sub> (ft <sup>2</sup> /day)	
m <sub>v</sub> (ft <sup>2</sup> /ton)	
Sec Compression C <sub>sec</sub>	



ASTM D2435-96	Test name	Consolidation Load: 2.000 (TSF)
Site Reference: C.F. Harvey	Date of Test:	11-30-16
Jobfile: E:\16010.JOB	Sample:	ST-9
Operator: <i>mk</i>	Borehole:	L-28694
Checked: <i>mk</i>	Approved:	



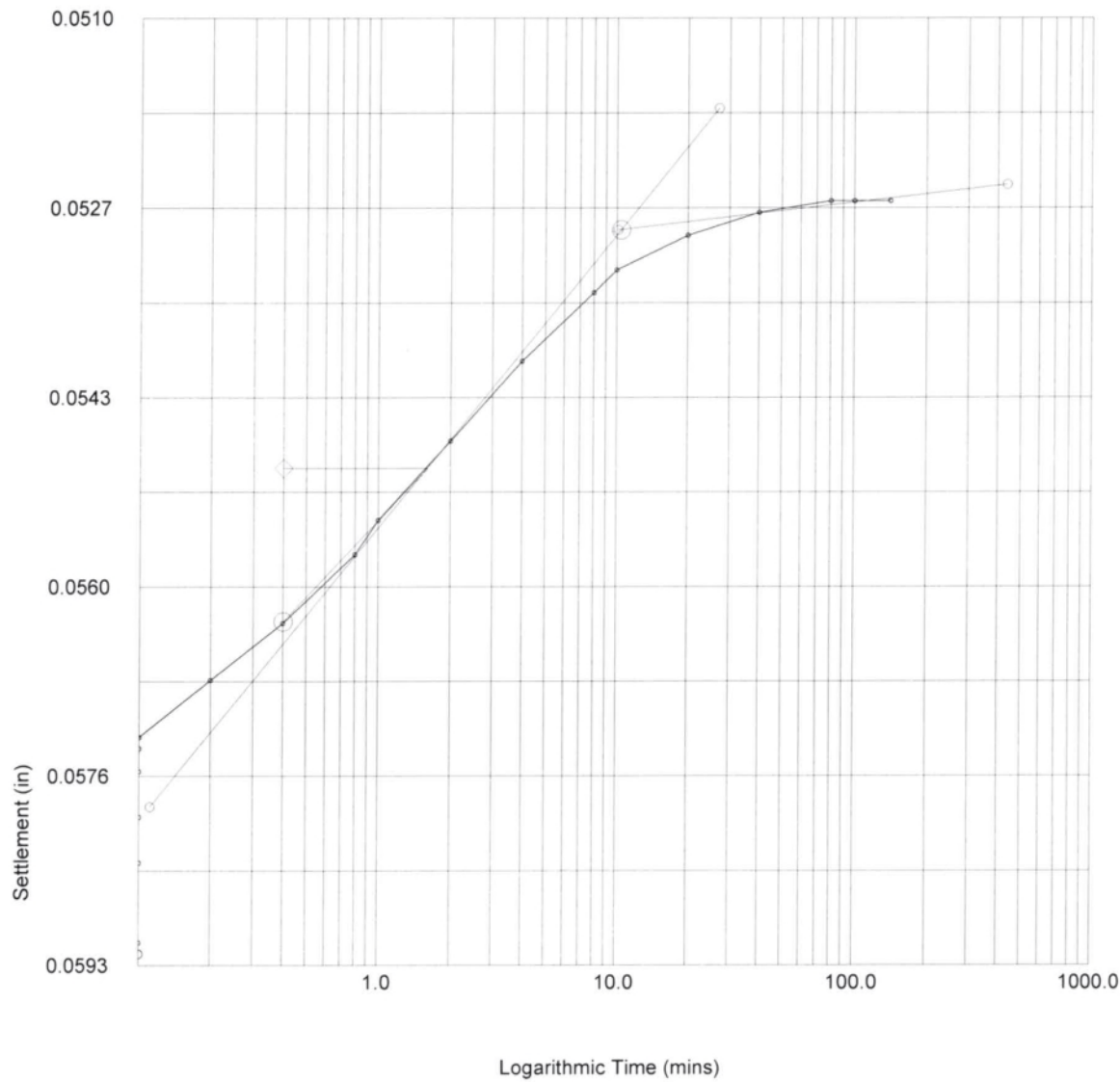
ASTM D2435-96	Test name	Consolidation
Site Reference: C.F. Harvey	Date of Test:	11-30-16
Jobfile: E:\16010.JOB	Sample:	ST-9
Operator: <i>mk</i>	Borehole:	L-28694
Checked: <i>mk</i>	Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	592	0.0592	0.0592
2	0.017	591	0.0591	0.0591
3	0.033	584	0.0584	0.0584
4	0.050	580	0.0580	0.0580
5	0.067	576	0.0576	0.0576
6	0.083	574	0.0574	0.0574
7	0.100	573	0.0573	0.0573
8	0.200	568	0.0568	0.0568
9	0.400	563	0.0563	0.0563
10	0.800	557	0.0557	0.0557
11	1.000	554	0.0554	0.0554
12	2.000	547	0.0547	0.0547
13	4.000	540	0.0540	0.0540
14	8.000	534	0.0534	0.0534
15	10.000	532	0.0532	0.0532
16	20.000	529	0.0529	0.0529
17	40.000	527	0.0527	0.0527
18	80.000	526	0.0526	0.0526
19	100.000	526	0.0526	0.0526
20	141.145	526	0.0526	0.0526

Oedometer Settlement Tests

Settlement Stage Results	
Vertical Stress (TSF)	0.500
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0066
Voids Ratio e	0.5498
Final Temp oC	
t <sub>50</sub> (mins)	
c <sub>v</sub> (ft <sup>2</sup> /day)	
m <sub>v</sub> (ft <sup>2</sup> /ton)	
Sec Compression C <sub>sec</sub>	






	ASTM D2435-96		Test name	Consolidation Load: 0.500 (TSF)
	Site Reference: C.F. Harvey		Date of Test:	11-30-16
	Jobfile: E:\16010.JOB		Sample:	ST-9
	Operator: <i>mlc</i>		Borehole:	L-28694
	Checked: <i>mlc</i>		Approved:	

	ASTM D2435-96		Test name	Consolidation
	Site Reference: C.F. Harvey		Date of Test:	11-30-16
	Jobfile: E:\16010.JOB		Sample:	ST-9
	Operator: <i>mlc</i>		Borehole:	L-28694
	Checked: <i>mlc</i>		Approved:	



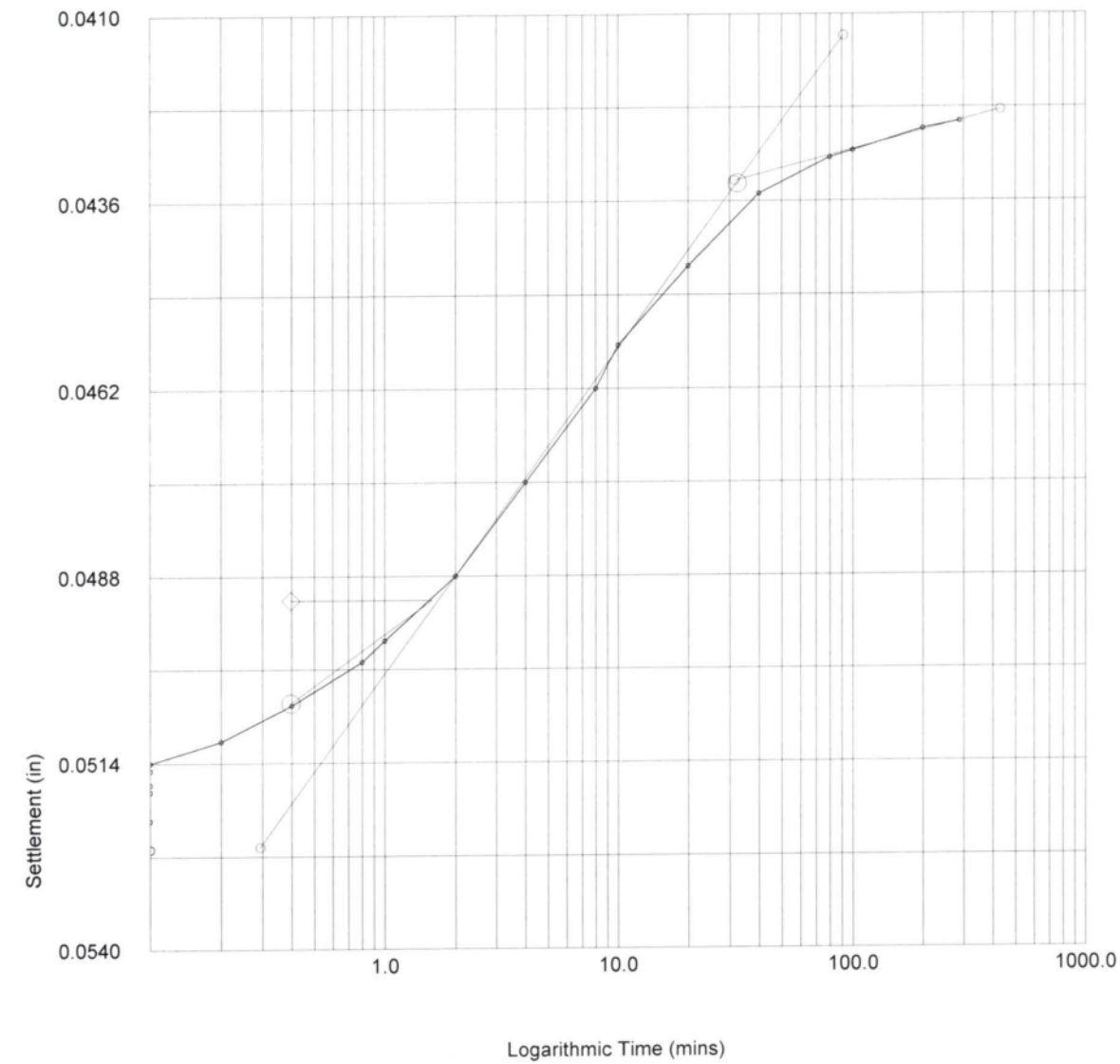
Oedometer Settlement Tests




No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	526	0.0526	0.0526
2	0.017	522	0.0522	0.0522
3	0.033	522	0.0522	0.0522
4	0.050	518	0.0518	0.0518
5	0.067	517	0.0517	0.0517
6	0.083	515	0.0515	0.0515
7	0.100	514	0.0514	0.0514
8	0.200	511	0.0511	0.0511
9	0.400	506	0.0506	0.0506
10	0.800	500	0.0500	0.0500
11	1.000	497	0.0497	0.0497
12	2.000	488	0.0488	0.0488
13	4.000	475	0.0475	0.0475
14	8.000	462	0.0462	0.0462
15	10.000	456	0.0456	0.0456
16	20.000	445	0.0445	0.0445
17	40.000	435	0.0435	0.0435
18	80.000	430	0.0430	0.0430
19	100.000	429	0.0429	0.0429
20	200.000	426	0.0426	0.0426
21	288.110	425	0.0425	0.0425

	ASTM D2435-96		Test name Consolidation Load: 0.050 (TSF)	
	Site Reference: C.F. Harvey		Date of Test: 11-30-16	
	Jobfile: E:\16010.JOB		Sample: ST-9	
	Operator: 		Borehole: L-28694	
	Checked: 		Approved:	

Oedometer Settlement Tests

Settlement Stage Results	
Vertical Stress (TSF)	0.050
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0101
Voids Ratio e	0.5663
Final Temp oC	
t <sub>50</sub> (mins)	
c <sub>v</sub> (ft <sup>2</sup> /day)	
m <sub>v</sub> (ft <sup>2</sup> /ton)	
Sec Compression C <sub>sec</sub>	



	ASTM D2435-96		Test name Consolidation	
	Site Reference: C.F. Harvey		Date of Test: 11-30-16	
	Jobfile: E:\16010.JOB		Sample: ST-9	
	Operator: 		Borehole: L-28694	
	Checked: 		Approved:	







Form No. TR-T88  
Revision No. 0  
Revision Date: 12/20/09

Particle Size Analysis of Soils  
AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 11/13/16

Project Name: NC 242 (Harvey Parkway)Test Date(s): 11/1-13/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

Client Name: NCDOT

Address: Raleigh, NC

Boring #: L-30000Sample #: SS-74Sample Date: 9/20/16

Location: 300+00Offset: CLDepth (ft): 8.4-9.9'

Sample Description: Sandy CLAY A-6 (1)

1.5"1"3/4"1/23/8"#4#10#20#40#60#100#200#270

100%  
90%  
80%  
70%  
60%  
50%  
40%  
30%  
20%  
10%  
0%

Percent Passing

1001010.10.010.001

Particle Size (mm)

As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm		
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm		

Maximum Particle Size	#10	Coarse Sand	15%	Silt	13%
Gravel	1%	Fine Sand	49%	Clay	22%
Apparent Relative Density	2.650	Moisture Content	19.1%	% Passing #200	37.9%
Liquid Limit	25	Plastic Limit	13	Plastic Index	12

Soil Mortar (-#10 Sieve)

Coarse Sand	15%	Fine Sand	50%	Silt	13%	Clay	22%
-------------	-----	-----------	-----	------	-----	------	-----

Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>	
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Karen Warner

Technician Name

118-06-0305

Certification No.

Laboratory Technician

Position

11/13/2016

Date

Stewart Laney

Technical Responsibility

Signature

Project Manager

Position

Date

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S&ME, Inc.

3201 Spring Forest Road  
Raleigh, NC 27616

55.L-30000 SS-74 (8.4-9.9').xls

Form No. TR-T88  
Revision No. 0  
Revision Date: 12/20/09

Particle Size Analysis of Soils  
AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 11/13/16

Project Name: NC 242 (Harvey Parkway)Test Date(s): 11/1-13/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

Client Name: NCDOT

Address: Raleigh, NC

Boring #: L-30900Sample #: SS-75Sample Date: 9/20/16

Location: 309+00Offset: CLDepth (ft): 0.0-1.5'

Sample Description: Sandy SILT A-4 (0)

1.5"1"3/4"1/23/8"#4#10#20#40#60#100#200#270

100%  
90%  
80%  
70%  
60%  
50%  
40%  
30%  
20%  
10%  
0%

Percent Passing

1001010.10.010.001

Particle Size (mm)

As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm		
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm		

Maximum Particle Size	#10	Coarse Sand	8%	Silt	32%
Gravel	0%	Fine Sand	40%	Clay	20%
Apparent Relative Density	2.650	Moisture Content	26.6%	% Passing #200	61.5%
Liquid Limit	18	Plastic Limit	14	Plastic Index	4

Soil Mortar (-#10 Sieve)

Coarse Sand	8%	Fine Sand	40%	Silt	32%	Clay	20%
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Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>	
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Karen Warner

Technician Name

118-06-0305

Certification No.

Laboratory Technician

Position

11/13/2016

Date

Stewart Laney

Technical Responsibility

Signature

Project Manager

Position

Date

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S&ME, Inc.

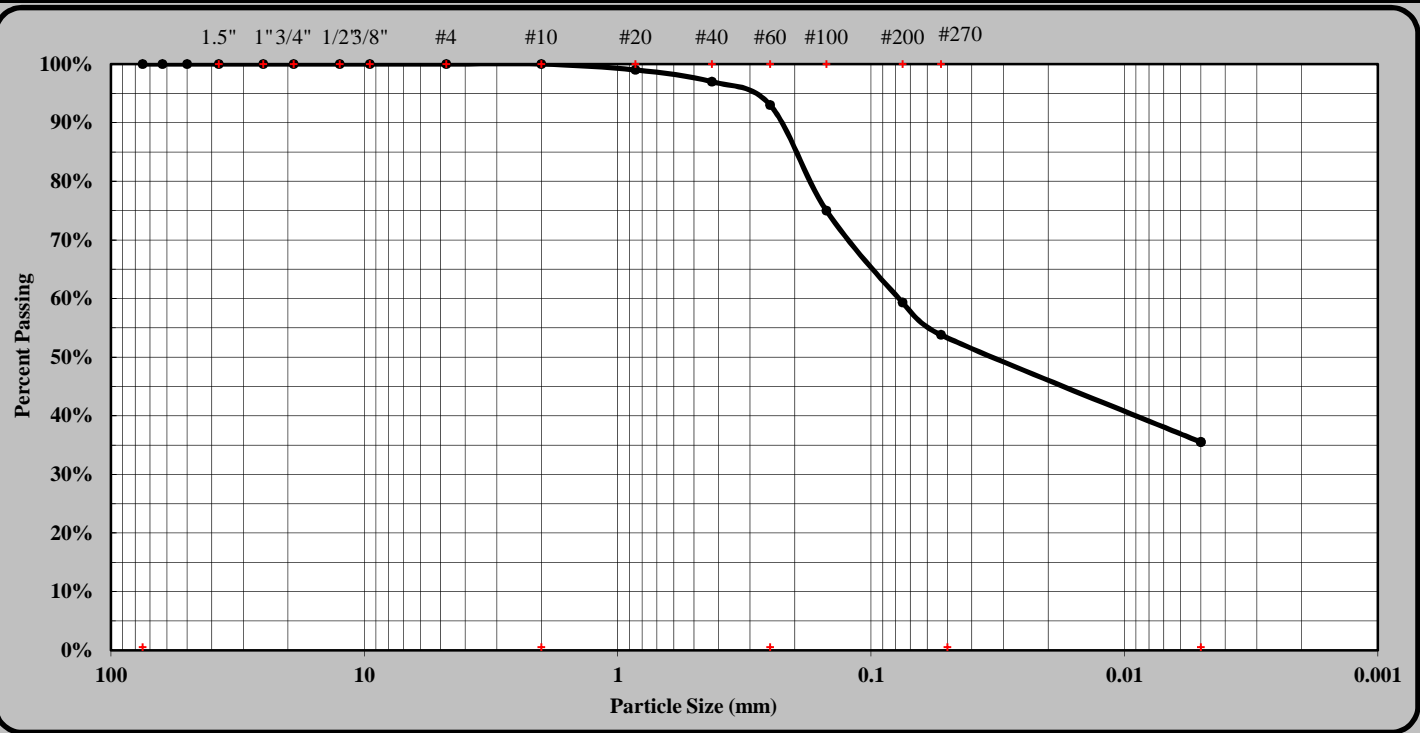
3201 Spring Forest Road  
Raleigh, NC 27616

56.L-30900 SS-75 (0.0-1.5').xls






S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	10/5/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	9/28 - 10/5/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-RT-36428	Sample #:	SS-85
Location:	364+28	Sample Date:	8/30/16
	Offset: 36' RT	Depth (ft):	4.0 - 5.5
Sample Description:	Gray Coarse to Fine Sandy Silty CLAY A-6 (5)		

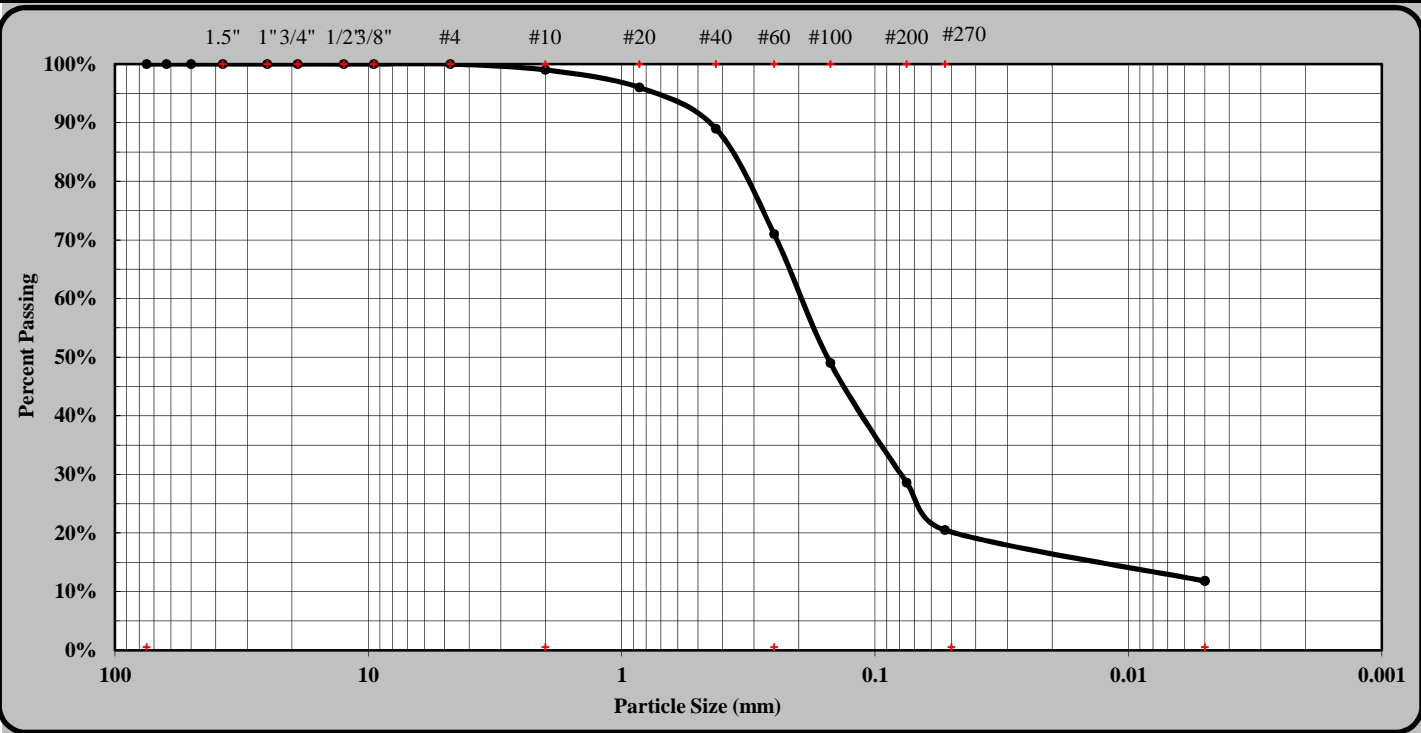


As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#4	Coarse Sand	7%	Silt	18%
Gravel	0%	Fine Sand	39%	Clay	36%
Apparent Relative Density	ND	Moisture Content	23.0%	% Passing #200	59.3%
Liquid Limit	27	Plastic Limit	13	Plastic Index	14
Soil Mortar (-#10 Sieve)					
Coarse Sand	7%	Fine Sand	39%	Silt	18%
		Clay			36%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>	
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	9/12/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	9/26/2016
Technical Responsibility	Signature	Position	Date
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	10/5/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	9/28 - 10/5/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	L-RT-36428	Sample #:	SS-86
Location:	364+28	Sample Date:	8/30/16
	Offset: 36' RT	Depth (ft):	44.0 - 44.7
Sample Description:	Dark Gray Silty Clayey Coarse to Fine SAND A-2-4 (0)		



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#4	Coarse Sand	28%	Silt	9%
Gravel	1%	Fine Sand	51%	Clay	12%
Apparent Relative Density	ND	Moisture Content	11.8%	% Passing #200	28.6%
Liquid Limit	17	Plastic Limit	16	Plastic Index	1
Soil Mortar (-#10 Sieve)					
Coarse Sand	28%	Fine Sand	51%	Silt	9%
		Clay			12%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>	
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	9/12/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	9/26/2016
Technical Responsibility	Signature	Position	Date
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Form No. TR-T88  
Revision No. 0  
Revision Date: 12/20/09

Particle Size Analysis of Soils  
AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 11/14/16

Project Name: C.F. Harvey Parkway Extension R-5703Test Date(s): 10/7 - 11/14/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

Client Name: Michael Baker Engineering

Address: Raleigh, NC

Boring #: Y1-3100Sample #: SS-110Sample Date: 8/9/16

Location: 31+00Offset: 23' LTDepth (ft): 4.0 - 5.5

Sample Description: Dark Gray Coarse to Fine Sandy Silty CLAY A-6 (4)

1.5"1"3/4"1/23/8"#4#10#20#40#60#100#200#270

100%90%80%70%60%50%40%30%20%10%0%

Percent Passing

1001010.10.010.001

Particle Size (mm)

As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm

Maximum Particle Size	#4	Coarse Sand	14%	Silt	14%
Gravel	1%	Fine Sand	39%	Clay	32%
Apparent Relative Density	ND	Moisture Content	21.2%	% Passing #200	51.1%
Liquid Limit	29	Plastic Limit	14	Plastic Index	15

Soil Mortar (-#10 Sieve)

Coarse Sand	14%	Fine Sand	40%	Silt	14%	Clay	32%
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Description of Sand & Gravel Particles:

Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>
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References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

Position

10/7/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

11/14/2016

Date

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S&ME, Inc.

3201 Spring Forest Road  
Raleigh, NC 27616

1002.Y1-3100 SS-110 (4 - 5.5 ft) Classification.xls

Form No. TR-T88  
Revision No. 0  
Revision Date: 12/20/09

Particle Size Analysis of Soils  
AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 11/3/16

Project Name: C.F. Harvey Parkway Extension R-5703Test Date(s): 10/7 - 11/15/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

Client Name: Michael Baker Engineering

Address: Raleigh, NC

Boring #: Y1-3702Sample #: SS-111Sample Date: 9/16/16

Location: 37+02Offset: 71' RTDepth (ft): 2.0 - 3.5

Sample Description: Brown Coarse to Fine Sandy Silty CLAY A-6 (4)

1.5"1"3/4"1/23/8"#4#10#20#40#60#100#200#270

100%90%80%70%60%50%40%30%20%10%0%

Percent Passing

1001010.10.010.001

Particle Size (mm)

As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm

Maximum Particle Size	#4	Coarse Sand	17%	Silt	15%
Gravel	1%	Fine Sand	41%	Clay	26%
Apparent Relative Density	ND	Moisture Content	18.6%	% Passing #200	46.1%
Liquid Limit	33	Plastic Limit	15	Plastic Index	18

Soil Mortar (-#10 Sieve)

Coarse Sand	17%	Fine Sand	42%	Silt	15%	Clay	26%
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Description of Sand & Gravel Particles:

Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>
----------------	--------------------------	------	--------------------------	---------------------	--------------------------

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

Position

11/3/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

9/26/2016

Date

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3201 Spring Forest Road  
Raleigh, NC 27616

1003.Y1-3702 SS-111 (2 - 3.5 ft) Classification.xls

Form No. TR-T88

Revision No. 0

Revision Date: 12/20/09

Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:6235-16-010

Report Date:9/20/16

Project Name:C.F. Harvey Parkway Extension R-5703

Test Date(s):9/12 - 9/20/16

State Project #:46375.1.1

F.A. Project No: N/A

TIP NO:R-5703

Client Name:Michael Baker Engineering

Address:Raleigh, NC

Boring #:Y1-4300

Sample #:SS-112

Sample Date:8/9/16

Location:43+00

Offset:61' LT

Depth (ft):0.0 - 1.5

Sample Description:Gray Coarse to Fine Sandy Clayey SILT

A-4

(0)

100%

90%

80%

70%

60%

50%

40%

30%

20%

10%

0%

100

10

1

0.1

0.01

0.001

1.5"1"3/4"1/23/8"#4#10#20#40#60#100#200#270

Percent Passing

Particle Size (mm)

As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm
Maximum Particle Size	#4	Coarse Sand	20%
Gravel	3%	Fine Sand	42%
Apparent Relative Density	ND	Moisture Content	16.2%
Liquid Limit	20	Plastic Limit	18
Soil Mortar (-#10 Sieve)			
Coarse Sand	21%	Fine Sand	43%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>
Hard & Durable		Soft	<input checked="" type="checkbox"/>

References / Comments / Deviations:

ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

Position

9/12/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

9/26/2016

Date

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3201 Spring Forest Road

Raleigh, NC 27616

1004.Y1-4300 SS-112 (0 - 1.5 ft) Classification.xls

Form No. TR-T88

Revision No. 0

Revision Date: 12/20/09

Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:6235-16-010

Report Date:9/20/16

Project Name:C.F. Harvey Parkway Extension R-5703

Test Date(s):9/12 - 9/20/16

State Project #:46375.1.1

F.A. Project No: N/A

TIP NO:R-5703

Client Name:Michael Baker Engineering

Address:Raleigh, NC

Boring #:Y1-4600

Sample #:SS-113

Sample Date:8/3/16

Location:46+00

Offset:26' LT

Depth (ft):4.0 - 5.5

Sample Description:Gray Coarse to Fine Sandy Silty CLAY

A-6

(1)

100%

90%

80%

70%

60%

50%

40%

30%

20%

10%

0%

100

10

1

0.1

0.01

0.001

1.5"1"3/4"1/23/8"#4#10#20#40#60#100#200#270

Percent Passing

Particle Size (mm)

As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm
Maximum Particle Size	#4	Coarse Sand	21%
Gravel	3%	Fine Sand	39%
Apparent Relative Density	ND	Moisture Content	22.5%
Liquid Limit	25	Plastic Limit	14
Soil Mortar (-#10 Sieve)			
Coarse Sand	22%	Fine Sand	40%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>
Hard & Durable		Soft	<input checked="" type="checkbox"/>

References / Comments / Deviations:

ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

Position

9/12/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

9/26/2016

Date

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3201 Spring Forest Road

Raleigh, NC 27616

1005.Y1-4600 SS-113 (4 - 5.5 ft) Classification.xls



Form No. TR-T88

Revision No. 0

Revision Date: 12/20/09

Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:6235-16-010

Report Date:9/20/16

Project Name:C.F. Harvey Parkway Extension R-5703

Test Date(s):9/12 - 9/20/16

State Project #:46375.1.1

F.A. Project No: N/A

TIP NO:R-5703

Client Name:Michael Baker Engineering

Address:Raleigh, NC

Boring #:Y1-4900

Sample #:SS-114

Sample Date:8/12/16

Location:49+00

Offset:24' RT

Depth (ft):2.0 - 3.5

Sample Description:Brown Coarse to Fine Sandy Clayey SILT

A-4

(0)

100%

90%

80%

70%

60%

50%

40%

30%

20%

10%

0%

100

10

1

0.1

0.01

0.001

1.5"

1"3/4"

1/2"3/8"

#4

#10

#20

#40

#60

#100

#200

#270

Percent Passing

Particle Size (mm)

As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm		
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm		
Maximum Particle Size	#4	Coarse Sand	23%	Silt	14%
Gravel	4%	Fine Sand	39%	Clay	19%
Apparent Relative Density	ND	Moisture Content	28.6%	% Passing #200	38.4%
Liquid Limit	24	Plastic Limit	15	Plastic Index	9
Soil Mortar (-#10 Sieve)					
Coarse Sand	24%	Fine Sand	41%	Silt	15%
				Clay	20%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>
Hard & Durable		<input checked="" type="checkbox"/>	Soft	<input checked="" type="checkbox"/>	Weathered & Friable
Weathered & Friable		<input checked="" type="checkbox"/>			

References / Comments / Deviations:

ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

Position

9/12/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

9/26/2016

Date

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Form No. TR-T88

Revision No. 0

Revision Date: 12/20/09

Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:6235-16-010

Report Date:12/27/16

Project Name:C.F. Harvey Parkway Extension R-5703

Test Date(s):12/24 - 12/27/16

State Project #:46375.1.1

F.A. Project No: N/A

TIP NO:R-5703

Client Name:Michael Baker Engineering

Address:Raleigh, NC

Boring #:Y1RPA-1606

Sample #:ST-13

Sample Date:9/21/16

Location:16+06

Offset:6' LT

Depth (ft):3.0 - 5.0 ft.

Sample Description:Gray Coarse to Fine Sandy Silty CLAY

A-7-6

(9)

100%

90%

80%

70%

60%

50%

40%

30%

20%

10%

0%

100

10

1

0.1

0.01

0.001

1.5"

1"3/4"

1/2"3/8"

#4

#10

#20

#40

#60

#100

#200

#270

Percent Passing

Particle Size (mm)

As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm		
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm		
Maximum Particle Size	3/8"	Coarse Sand	16%	Silt	9%
Gravel	3%	Fine Sand	32%	Clay	40%
Apparent Relative Density	ND	Moisture Content	24.3%	% Passing #200	52.1%
Liquid Limit	42	Plastic Limit	17	Plastic Index	25
Soil Mortar (-#10 Sieve)					
Coarse Sand	16%	Fine Sand	34%	Silt	9%
				Clay	41%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>
Hard & Durable		<input checked="" type="checkbox"/>	Soft	<input checked="" type="checkbox"/>	Weathered & Friable
Weathered & Friable		<input checked="" type="checkbox"/>			

References / Comments / Deviations:

ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

Position

12/27/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

9/26/2016

Date

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S&ME, Inc.

3201 Spring Forest Road  
Raleigh, NC 27616

1006.Y1-4900 SS-114 (2 - 3.5 ft) Classification.xls

S&ME, Inc.

3201 Spring Forest Road  
Raleigh, NC 27616

1100a.Y1RPA-1606 ST-13 (3.0 - 5.0 ft) Classification.xls

Oedometer Settlement Tests

Sample details

Sketch showing specimen location in original Sample

Depth

3.0 - 5.0 ft.

Description:

Gray Coarse to Fine Sandy Silty CLAY (A-7-6) (9)

Type

Undisturbed

Height  $H_0$  (in)

0.998

Diameter  $D_0$  (in)

2.501

Weight  $W_0$  (gr)

156.15

Bulk Density  $\rho$  (PCF)

121.33

Particle Density  $\rho_s$

2.669  
(measured)

Initial Conditions

Settlement Channel

1066

Moisture Content  $w_0\%$

24.3

Dry Density  $\rho_d$  (PCF)

97.64

Voids Ratio  $e_0$

0.7058

Deg of Saturation  $S_0\%$

91.8

Swelling Pressure  $S_s$  (TSF)

0.000

Final Conditions

Moisture Content  $w_f\%$

24.1

Dry Density  $\rho_d$  (PCF)

100.33

Voids Ratio  $e_f$

0.6600

Deg of Saturation  $S_f\%$

97.37

Settlement: (in)

0.027

Compression Index  $C_c$

0.118

Notes:

Test specimen taken from the middle portion of UD tube.

S&ME

ASTM D2435-96

Test name

Consolidation

Site Reference:

C.F. Harvey

Jobfile:

E:\16010.JOB

Operator:

mk

Date of Test:

12-16-16

Sample:

ST-13

Borehole:

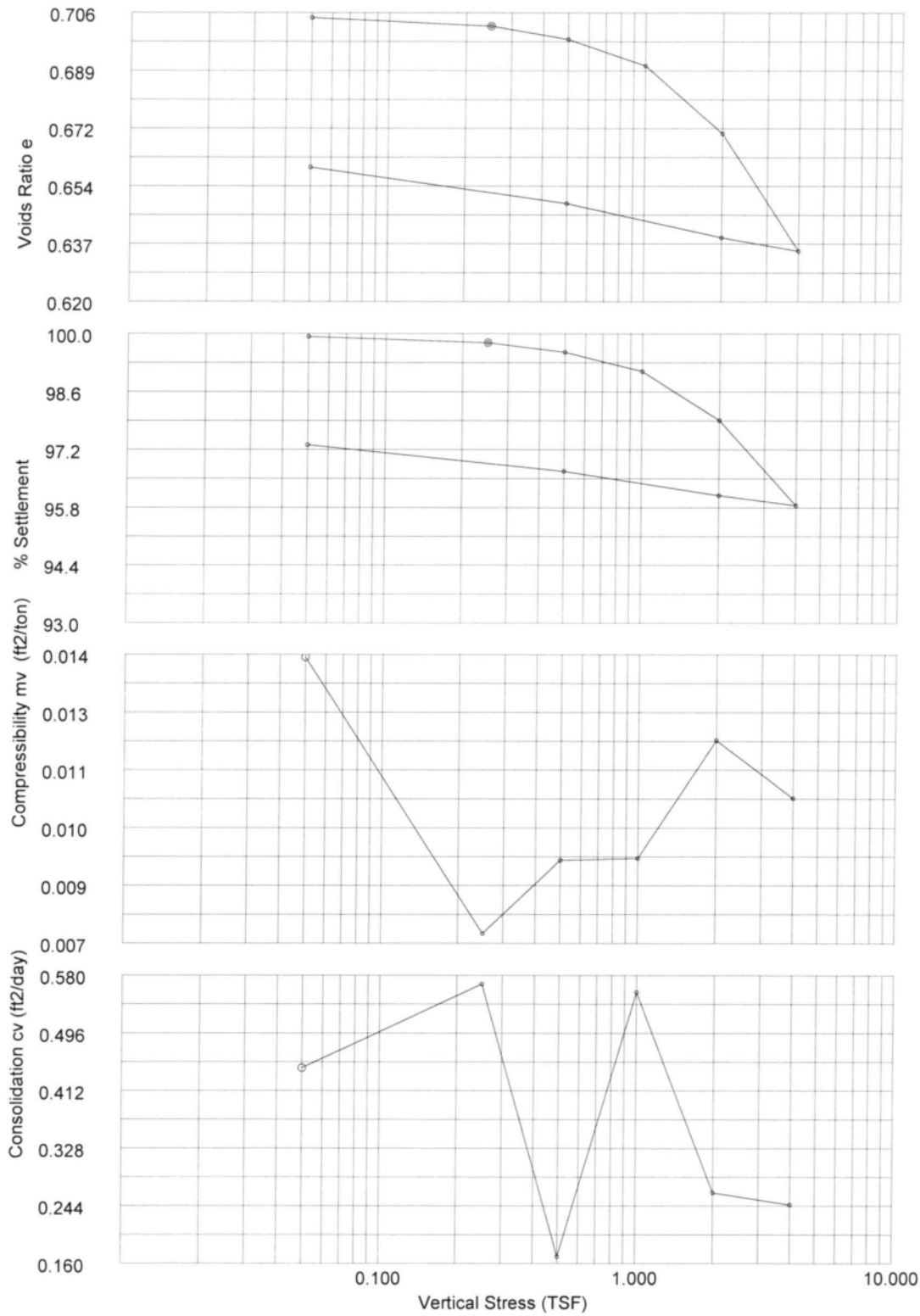
Y1RPA-1606

Checked:

mk

Approved:

Oedometer Settlement Tests



S&ME

ASTM D2435-96

Test name

Consolidation

Site Reference:

C.F. Harvey

Jobfile:

E:\16010.JOB

Operator:

mk

Date of Test:

12-16-16

Sample:

ST-13

Borehole:

Y1RPA-1606

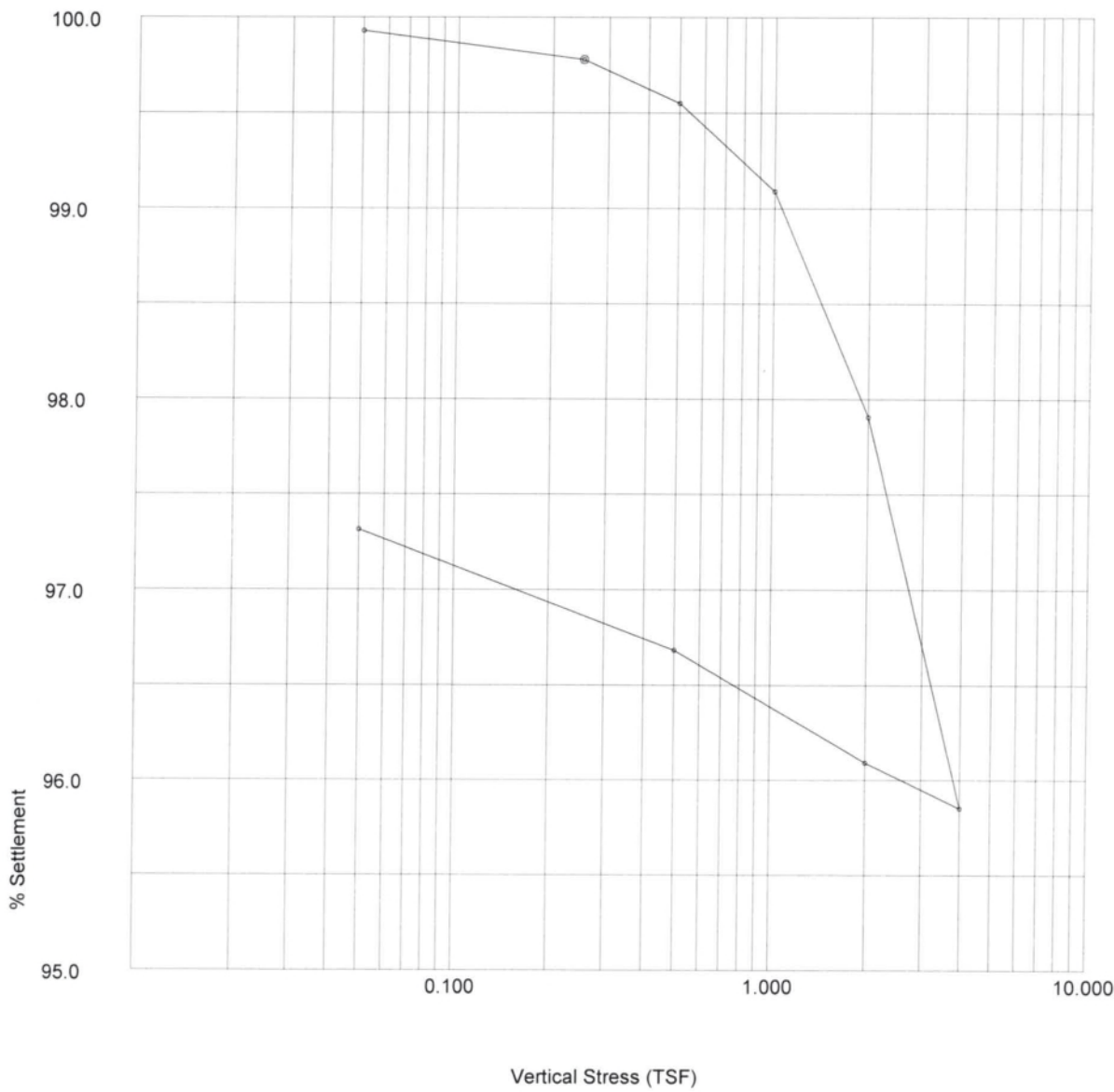
Checked:

mk

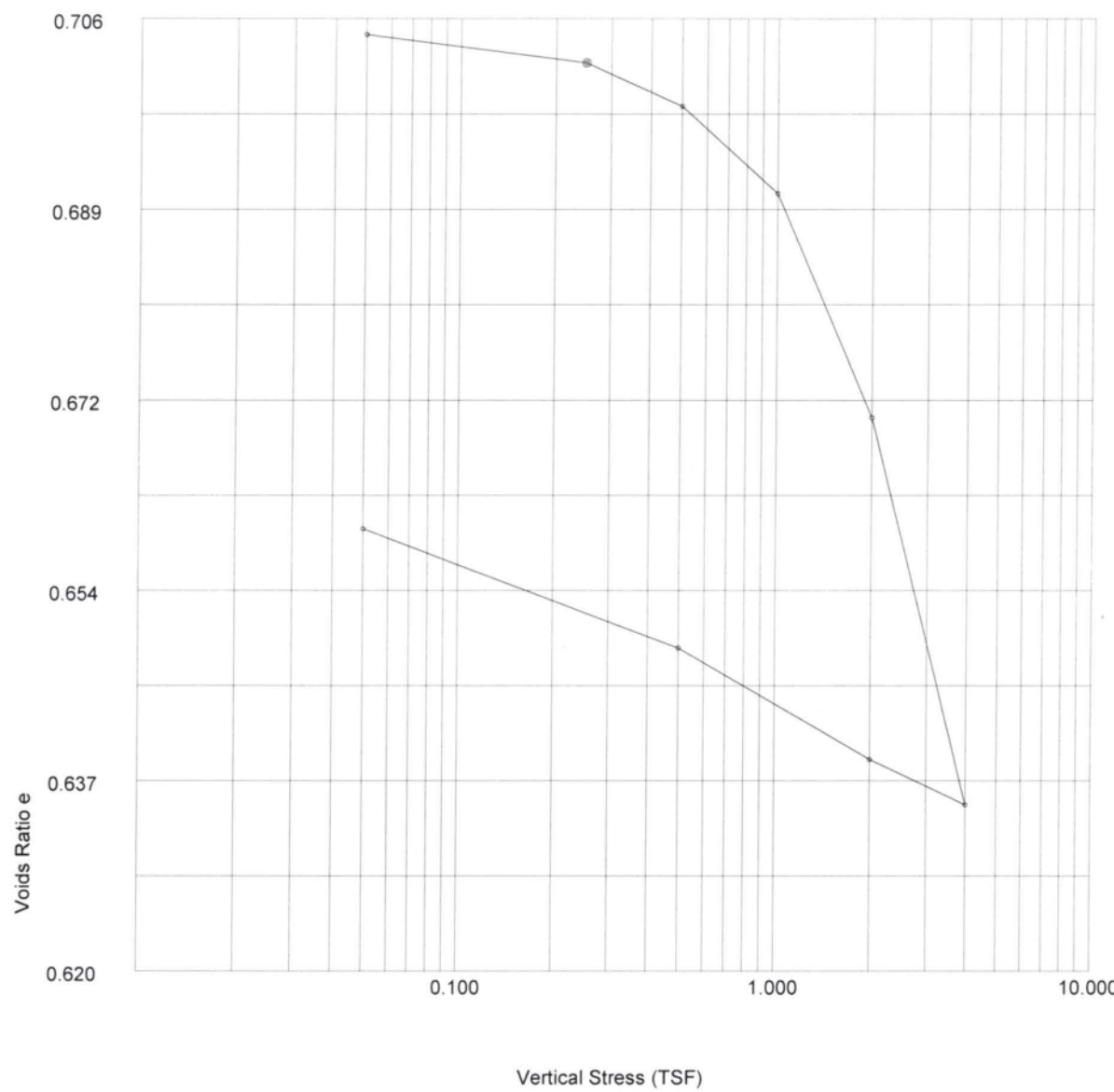
Approved:



Oedometer Settlement Tests



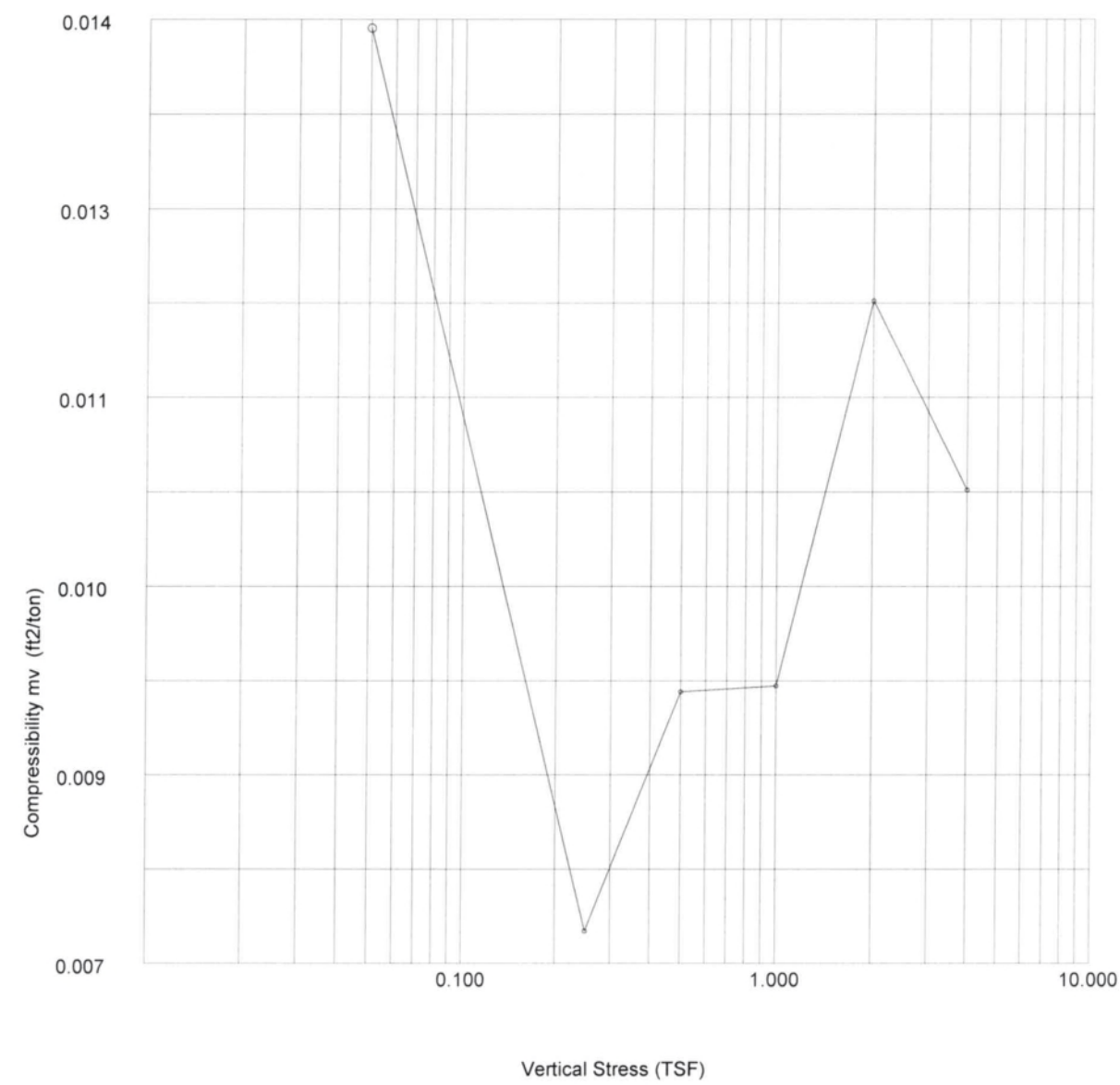
Oedometer Settlement Tests



	ASTM D2435-96		Test name	Consolidation
			Date of Test:	12-16-16
	Site Reference:	C.F. Harvey	Sample:	ST-13
	Jobfile:	E:\16010.JOB	Borehole:	Y1RPA-1606
Operator: <i>mhc</i>		Checked: <i>mhc</i>	Approved:	

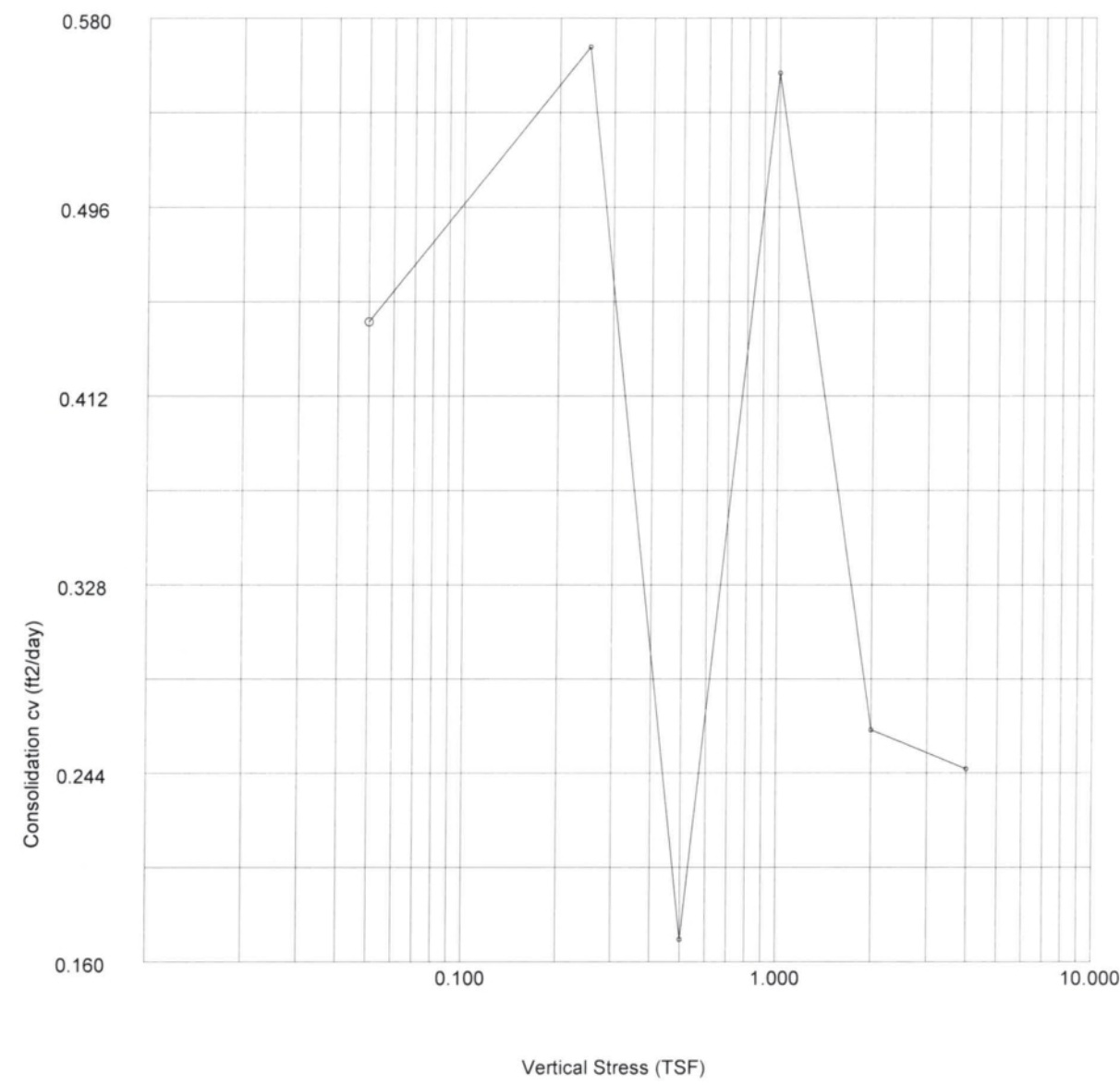
	ASTM D2435-96		Test name	Consolidation
			Date of Test:	12-16-16
	Site Reference:	C.F. Harvey	Sample:	ST-13
	Jobfile:	E:\16010.JOB	Borehole:	Y1RPA-1606
Operator: <i>mhc</i>		Checked: <i>mhc</i>	Approved:	

Oedometer Settlement Tests



	ASTM D2435-96		Test name	Consolidation
	Site Reference: C.F. Harvey		Date of Test:	12-16-16
	Jobfile: E:\16010.JOB		Sample:	ST-13
	Operator: <i>mlc</i>		Borehole:	Y1RPA-1606
	Checked: <i>mlc</i>		Approved:	

Oedometer Settlement Tests



	ASTM D2435-96		Test name	Consolidation
	Site Reference: C.F. Harvey		Date of Test:	12-16-16
	Jobfile: E:\16010.JOB		Sample:	ST-13
	Operator: <i>mlc</i>		Borehole:	Y1RPA-1606
	Checked: <i>mlc</i>		Approved:	

Oedometer Settlement Tests

Stress (TSF)	Initial Temp. oC	Settlement Total (in)	Cal Corr. (in)	Final Temp. oC	Voids Ratio e <sub>f</sub>	t <sub>50</sub> (mins)	Secondary Compr C <sub>sec</sub>	c <sub>v</sub> (ft2/day)	m <sub>v</sub> (ft2/ton)
0.050	21.6	0.0007	0.0	21.6	0.7046	1.118	0.00	0.445	0.014
0.250	21.6	0.0022	0.0	21.6	0.7020	0.875	0.0002	0.567	0.008
0.500	21.6	0.0045	0.0	21.6	0.6981	2.910	0.0001	0.170	0.009
1.000	21.6	0.0091	0.0	21.6	0.6902	0.884	0.0005	0.555	0.009
2.000	21.6	0.0209	0.0	21.6	0.6701	1.835	0.0008	0.263	0.012
4.000	21.6	0.0414	0.0	21.6	0.6350	1.901	0.0011	0.246	0.011
2.000	21.6	0.0390	0.0	21.6	0.6391				0.001
0.500	21.6	0.0331	0.0	21.6	0.6492				0.004
0.050	21.6	0.0268	0.0	21.6	0.6600				0.014

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	0	0.0000	0.0000
2	0.017	1	0.0001	0.0001
3	0.033	1	0.0001	0.0001
4	0.050	1	0.0001	0.0001
5	0.067	2	0.0002	0.0002
6	0.083	2	0.0002	0.0002
7	0.100	3	0.0003	0.0003
8	0.200	3	0.0003	0.0003
9	0.400	4	0.0004	0.0004
10	0.800	4	0.0004	0.0004
11	1.000	5	0.0005	0.0005
12	2.000	5	0.0005	0.0005
13	4.000	6	0.0006	0.0006
14	8.000	6	0.0006	0.0006
15	10.000	7	0.0007	0.0007
16	20.000	7	0.0007	0.0007
17	39.913	7	0.0007	0.0007



ASTM D2435-96		Test name Consolidation	
Site Reference: C.F. Harvey		Date of Test: 12-16-16	
Jobfile: E:\16010.JOB		Sample: ST-13	
Operator: <i>ml</i>		Borehole: Y1RPA-1606	
Checked: <i>ml</i>		Approved:	

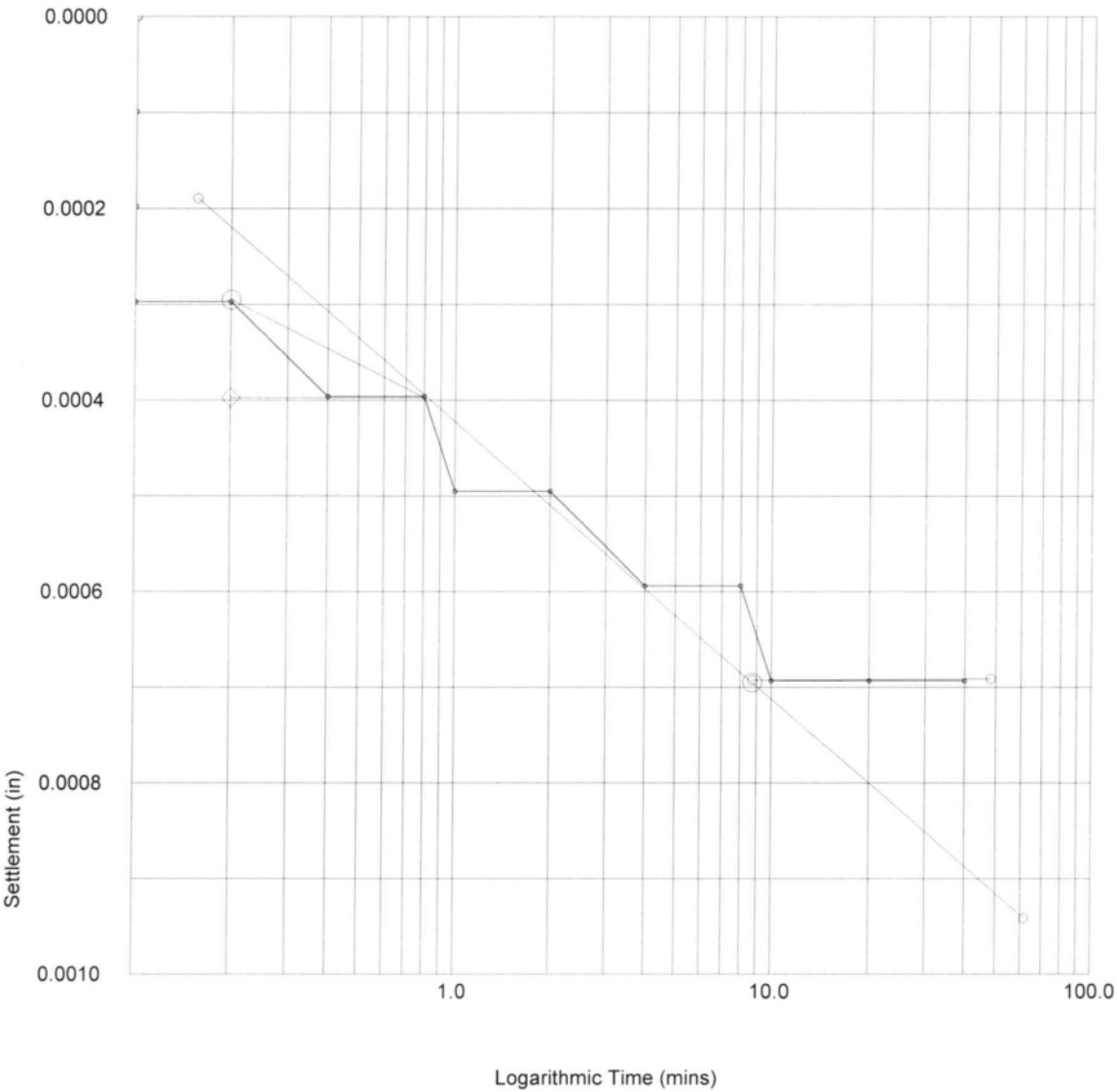


ASTM D2435-96		Test name Consolidation Load: 0.050 (TSF)	
Site Reference: C.F. Harvey		Date of Test: 12-16-16	
Jobfile: E:\16010.JOB		Sample: ST-13	
Operator: <i>ml</i>		Borehole: Y1RPA-1606	
Checked: <i>ml</i>		Approved:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.050
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0007
Voids Ratio e	0.7046
Final Temp oC	0.0
t <sub>50</sub> (mins)	1.12
c <sub>v</sub> (ft <sup>2</sup> /day)	0.445
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.014
Sec Compression C <sub>sec</sub>	0.00



ASTM D2435-96	Test name	Consolidation
Site Reference: C.F. Harvey	Date of Test:	12-16-16
Jobfile: E:\16010.JOB	Sample:	ST-13
Operator: <i>mlk</i>	Borehole:	Y1RPA-1606
Checked: <i>mlk</i>	Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	7	0.0007	0.0007
2	0.017	9	0.0009	0.0009
3	0.033	9	0.0009	0.0009
4	0.050	11	0.0011	0.0011
5	0.067	12	0.0012	0.0012
6	0.083	13	0.0013	0.0013
7	0.100	13	0.0013	0.0013
8	0.200	14	0.0014	0.0014
9	0.400	15	0.0015	0.0015
10	0.800	16	0.0016	0.0016
11	1.000	16	0.0016	0.0016
12	2.000	17	0.0017	0.0017
13	4.000	19	0.0019	0.0019
14	8.000	19	0.0019	0.0019
15	10.000	20	0.0020	0.0020
16	20.000	20	0.0020	0.0020
17	40.000	21	0.0021	0.0021
18	80.317	22	0.0022	0.0022
19	100.317	22	0.0022	0.0022
20	106.250	22	0.0022	0.0022



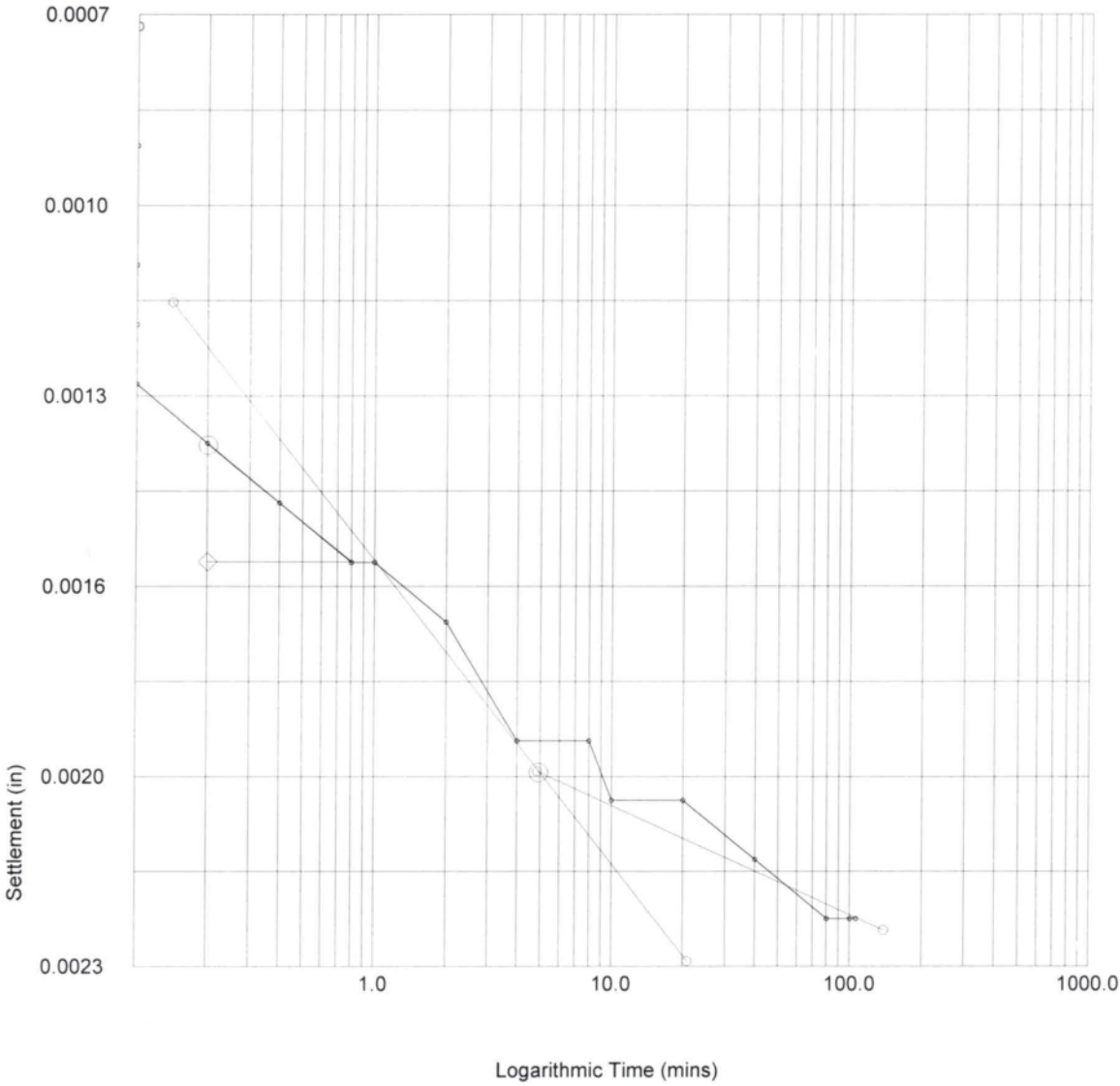
ASTM D2435-96	Test name	Consolidation	Load: 0.250 (TSF)
Site Reference: C.F. Harvey	Date of Test:	12-16-16	
Jobfile: E:\16010.JOB	Sample:	ST-13	
Operator: <i>mlk</i>	Borehole:	Y1RPA-1606	
Checked: <i>mlk</i>	Approved:		



Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.250
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0015
Voids Ratio e	0.7020
Final Temp oC	0.0
t <sub>50</sub> (mins)	0.88
c <sub>v</sub> (ft <sup>2</sup> /day)	0.567
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.008
Sec Compression C <sub>sec</sub>	0.0002



ASTM D2435-96	Test name	Consolidation
Site Reference: C.F. Harvey	Date of Test:	12-16-16
Jobfile: E:\16010.JOB	Sample:	ST-13
Operator: <i>mk</i>	Borehole:	Y1RPA-1606
Checked: <i>mk</i>	Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	22	0.0022	0.0022
2	0.017	25	0.0025	0.0025
3	0.033	29	0.0029	0.0029
4	0.050	30	0.0030	0.0030
5	0.067	31	0.0031	0.0031
6	0.083	31	0.0031	0.0031
7	0.100	31	0.0031	0.0031
8	0.200	32	0.0032	0.0032
9	0.400	33	0.0033	0.0033
10	0.800	34	0.0034	0.0034
11	1.000	35	0.0035	0.0035
12	2.000	36	0.0036	0.0036
13	4.000	38	0.0038	0.0038
14	8.000	39	0.0039	0.0039
15	10.000	39	0.0039	0.0039
16	20.000	40	0.0040	0.0040
17	40.000	41	0.0041	0.0041
18	80.000	42	0.0042	0.0042
19	100.000	43	0.0043	0.0043
20	200.000	44	0.0044	0.0044
21	400.000	44	0.0044	0.0044
22	800.000	45	0.0045	0.0045
23	1037.850	45	0.0045	0.0045

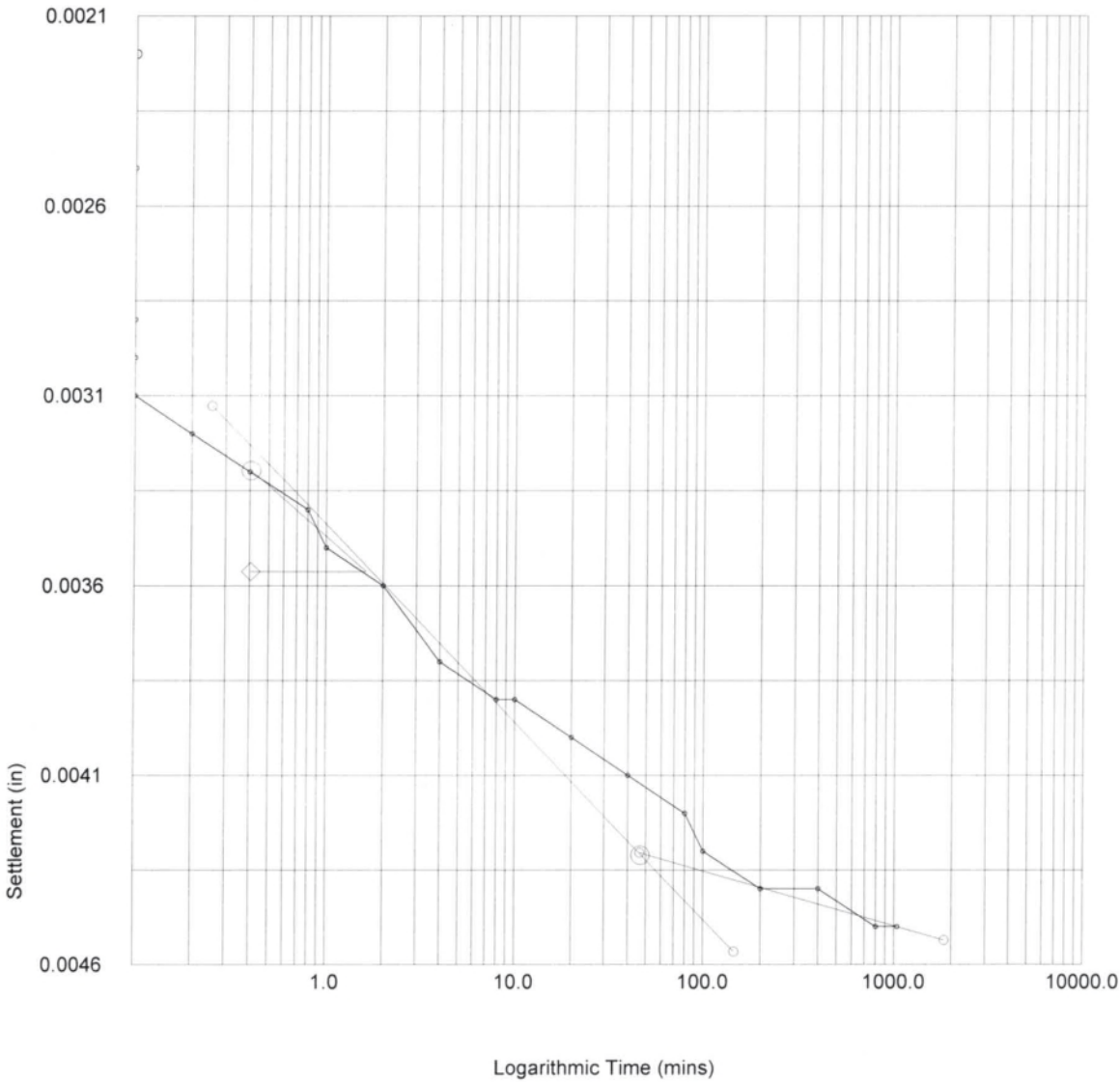


ASTM D2435-96	Test name	Consolidation Load: 0.500 (TSF)
Site Reference: C.F. Harvey	Date of Test:	12-16-16
Jobfile: E:\16010.JOB	Sample:	ST-13
Operator: <i>mk</i>	Borehole:	Y1RPA-1606
Checked: <i>mk</i>	Approved:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.500
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0023
Voids Ratio e	0.6981
Final Temp oC	0.0
t <sub>50</sub> (mins)	2.91
c <sub>v</sub> (ft <sup>2</sup> /day)	0.17
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.009
Sec Compression C <sub>sec</sub>	0.0001



ASTM D2435-96	Test name	Consolidation
Site Reference: C.F. Harvey	Date of Test:	12-16-16
Jobfile: E:\16010.JOB	Sample:	ST-13
Operator: <i>mk</i>	Borehole:	Y1RPA-1606
Checked: <i>mk</i>	Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	45	0.0045	0.0045
2	0.017	56	0.0056	0.0056
3	0.033	62	0.0062	0.0062
4	0.050	65	0.0065	0.0065
5	0.067	66	0.0066	0.0066
6	0.083	67	0.0067	0.0067
7	0.100	68	0.0068	0.0068
8	0.200	71	0.0071	0.0071
9	0.400	73	0.0073	0.0073
10	0.800	75	0.0075	0.0075
11	1.000	76	0.0076	0.0076
12	2.000	79	0.0079	0.0079
13	4.000	81	0.0081	0.0081
14	8.000	82	0.0082	0.0082
15	10.000	83	0.0083	0.0083
16	20.000	86	0.0086	0.0086
17	40.000	88	0.0088	0.0088
18	80.217	90	0.0090	0.0090
19	100.217	91	0.0091	0.0091
20	125.417	91	0.0091	0.0091

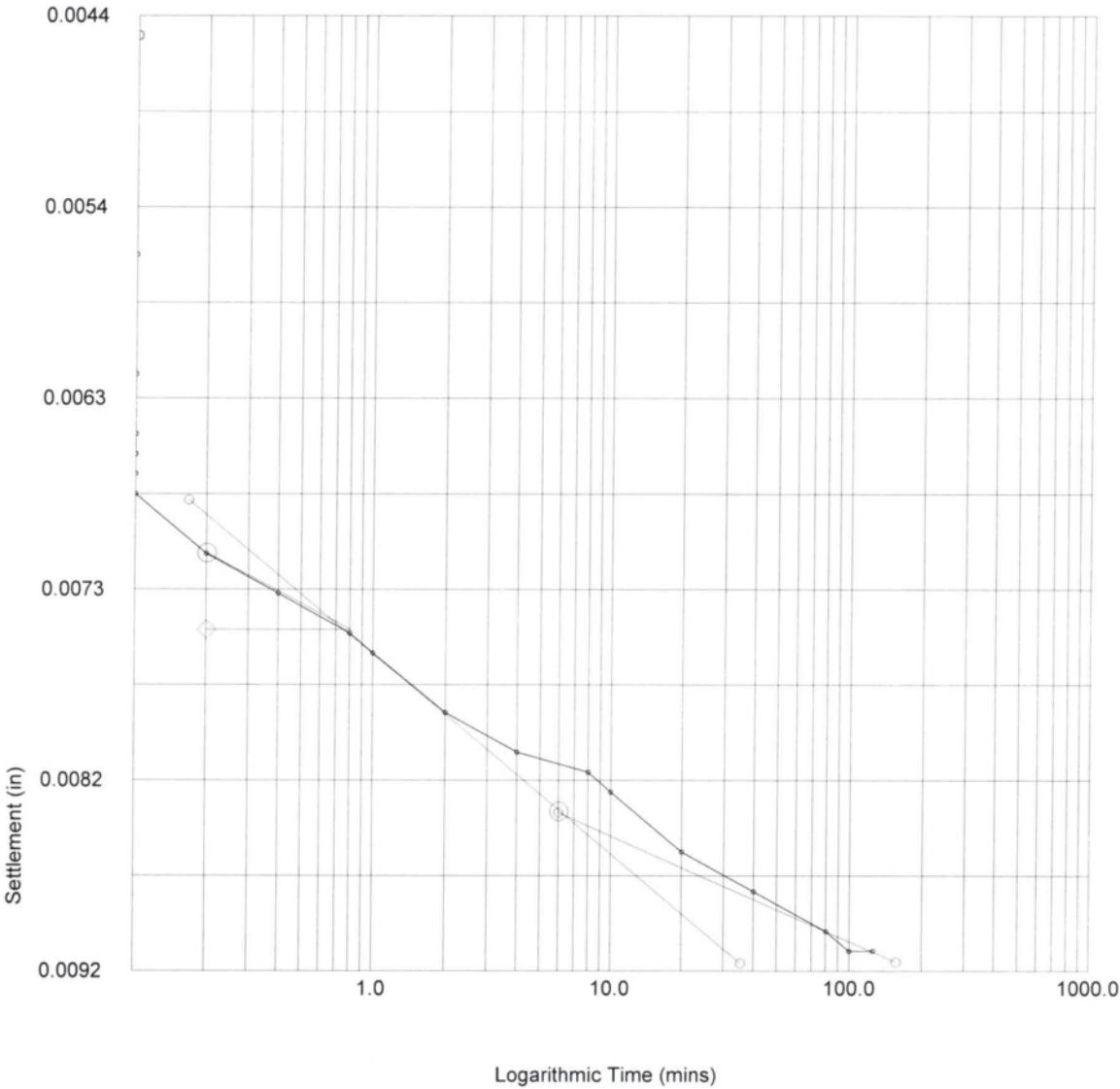


ASTM D2435-96	Test name	Consolidation Load: 1.000 (TSF)
Site Reference: C.F. Harvey	Date of Test:	12-16-16
Jobfile: E:\16010.JOB	Sample:	ST-13
Operator: <i>mk</i>	Borehole:	Y1RPA-1606
Checked: <i>mk</i>	Approved:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	1.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0046
Voids Ratio e	0.6902
Final Temp oC	0.0
t <sub>50</sub> (mins)	0.88
c <sub>v</sub> (ft <sup>2</sup> /day)	0.555
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.009
Sec Compression C <sub>sec</sub>	0.0005



ASTM D2435-96

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: *mk*

Test name: Consolidation  
Date of Test: 12-16-16

Sample: ST-13  
Borehole: Y1RPA-1606

Checked: *mk*

Approved:

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	91	0.0091	0.0091
2	0.017	96	0.0096	0.0096
3	0.033	133	0.0133	0.0133
4	0.050	141	0.0141	0.0141
5	0.067	146	0.0146	0.0146
6	0.083	149	0.0149	0.0149
7	0.100	152	0.0152	0.0152
8	0.200	157	0.0157	0.0157
9	0.400	162	0.0162	0.0162
10	0.800	168	0.0168	0.0168
11	1.000	169	0.0169	0.0169
12	2.000	175	0.0175	0.0175
13	4.000	182	0.0182	0.0182
14	8.000	188	0.0188	0.0188
15	10.000	190	0.0190	0.0190
16	20.000	196	0.0196	0.0196
17	40.000	200	0.0200	0.0200
18	80.000	204	0.0204	0.0204
19	100.000	206	0.0206	0.0206
20	200.000	209	0.0209	0.0209
21	211.000	209	0.0209	0.0209



ASTM D2435-96

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: *mk*

Test name: Consolidation Load: 2.000 (TSF)  
Date of Test: 12-16-16

Sample: ST-13  
Borehole: Y1RPA-1606

Checked: *mk*

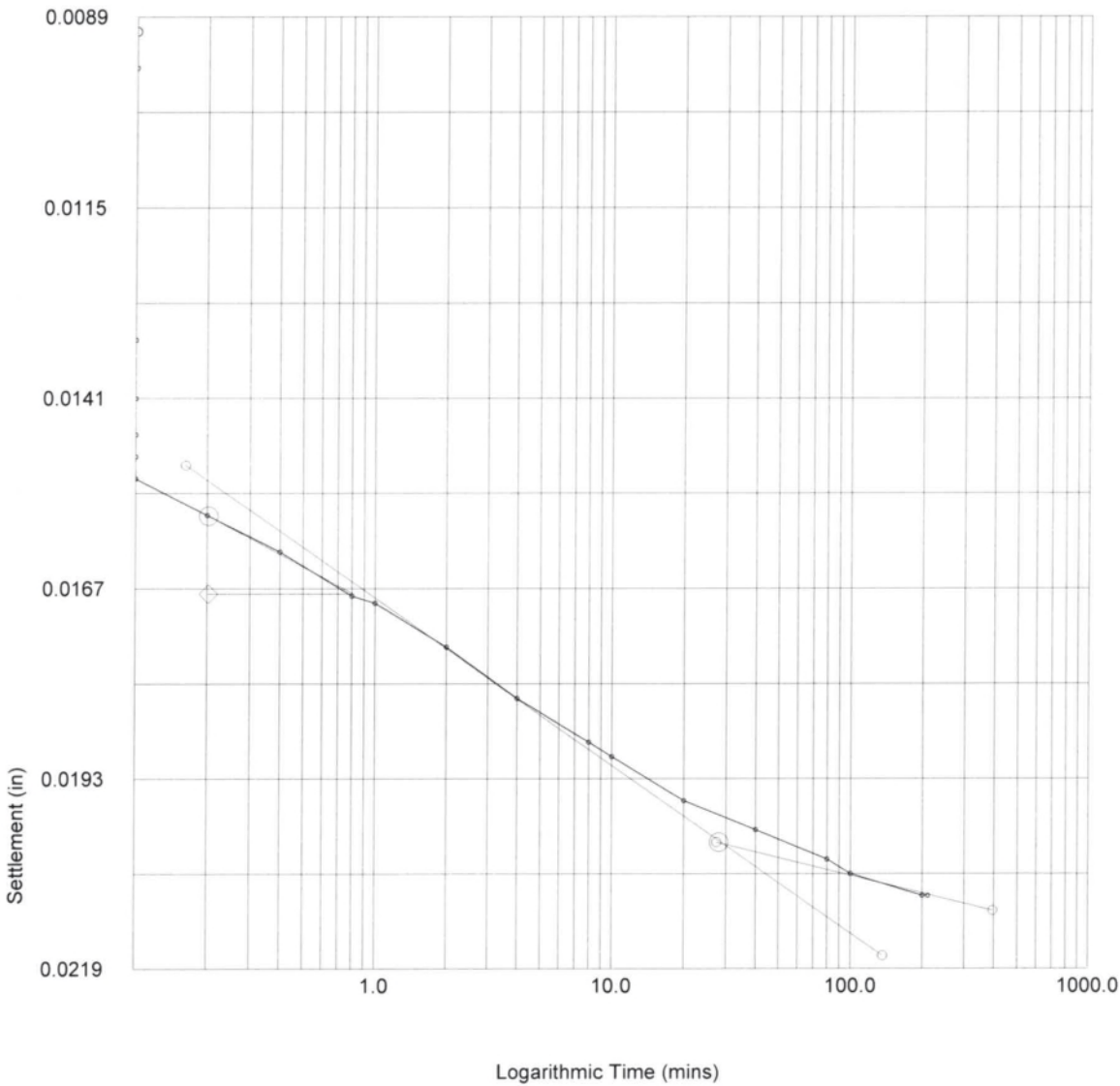
Approved:



Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	2.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0118
Voids Ratio e	0.6701
Final Temp oC	0.0
t <sub>50</sub> (mins)	1.83
c <sub>v</sub> (ft <sup>2</sup> /day)	0.263
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.012
Sec Compression C <sub>sec</sub>	0.0008



ASTM D2435-96	Test name	Consolidation
Site Reference: C.F. Harvey	Date of Test:	12-16-16
Jobfile: E:\16010.JOB	Sample:	ST-13
Operator: <i>mk</i>	Borehole:	Y1RPA-1606
Checked: <i>mk</i>	Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	209	0.0209	0.0209
2	0.017	211	0.0211	0.0211
3	0.033	231	0.0231	0.0231
4	0.050	259	0.0259	0.0259
5	0.067	297	0.0297	0.0297
6	0.083	302	0.0302	0.0302
7	0.100	307	0.0307	0.0307
8	0.200	319	0.0319	0.0319
9	0.400	328	0.0328	0.0328
10	0.800	337	0.0337	0.0337
11	1.000	341	0.0341	0.0341
12	2.000	355	0.0355	0.0355
13	4.000	368	0.0368	0.0368
14	8.000	382	0.0382	0.0382
15	10.000	386	0.0386	0.0386
16	20.000	396	0.0396	0.0396
17	40.000	404	0.0404	0.0404
18	80.000	409	0.0409	0.0409
19	100.000	411	0.0411	0.0411
20	200.000	414	0.0414	0.0414
21	215.130	414	0.0414	0.0414



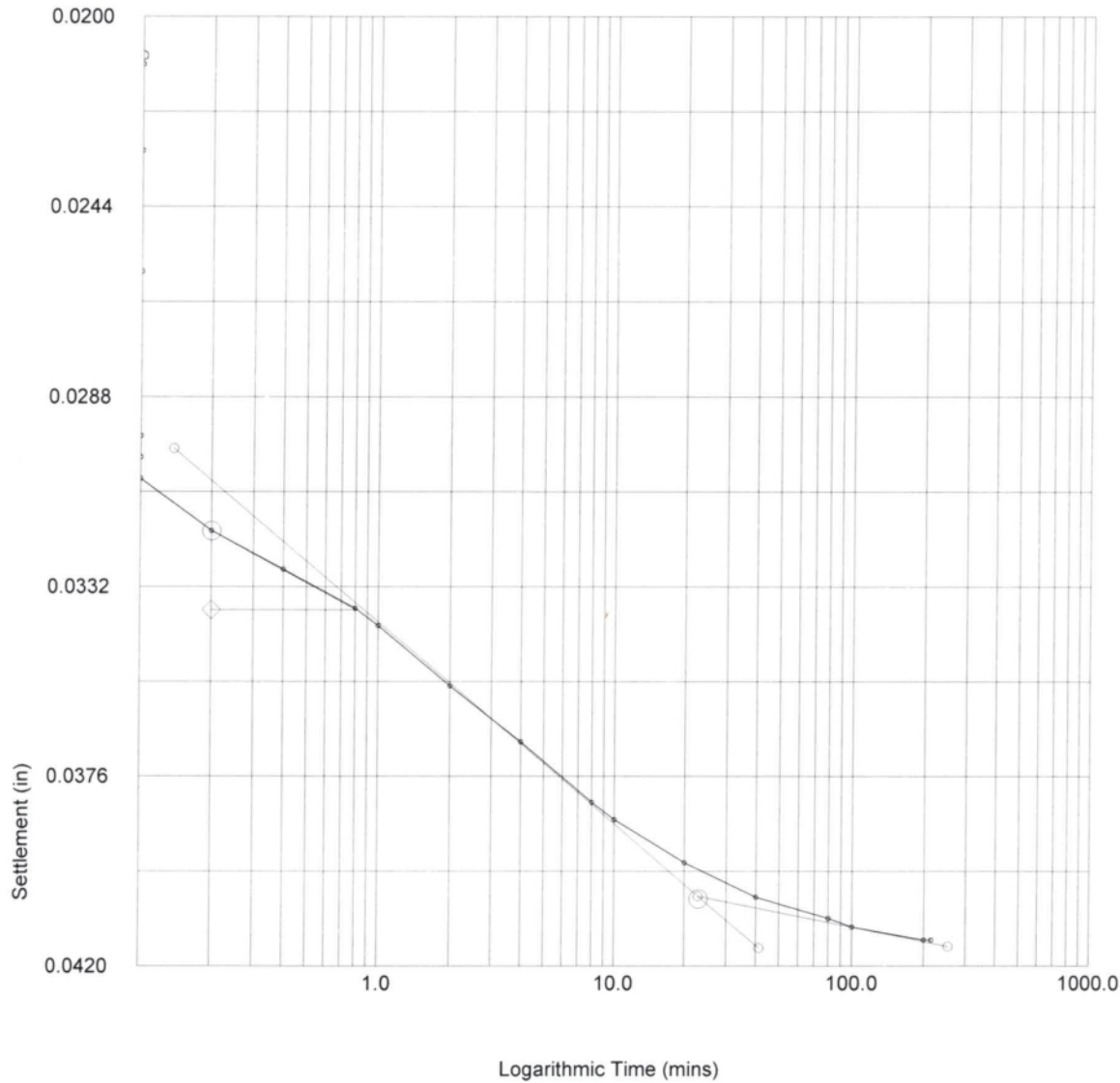
ASTM D2435-96	Test name	Consolidation	Load: 4.000 (TSF)
Site Reference: C.F. Harvey	Date of Test:	12-16-16	
Jobfile: E:\16010.JOB	Sample:	ST-13	
Operator: <i>mk</i>	Borehole:	Y1RPA-1606	
Checked: <i>mk</i>	Approved:		



Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	4.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0205
Voids Ratio e	0.6350
Final Temp oC	0.0
t <sub>50</sub> (mins)	1.90
c <sub>v</sub> (ft <sup>2</sup> /day)	0.246
m <sub>v</sub> (ft <sup>2</sup> /ton)	0.011
Sec Compression C <sub>sec</sub>	0.0011



ASTM D2435-96		Test name	Consolidation
Site Reference: C.F. Harvey		Date of Test:	12-16-16
Jobfile: E:\16010.JOB		Sample:	ST-13
Operator: MK		Borehole:	Y1RPA-1606
Checked: MK		Approved:	

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	414	0.0414	0.0414
2	0.017	405	0.0405	0.0405
3	0.033	405	0.0405	0.0405
4	0.050	400	0.0400	0.0400
5	0.067	400	0.0400	0.0400
6	0.083	399	0.0399	0.0399
7	0.100	399	0.0399	0.0399
8	0.200	398	0.0398	0.0398
9	0.400	397	0.0397	0.0397
10	0.800	395	0.0395	0.0395
11	1.000	395	0.0395	0.0395
12	2.000	393	0.0393	0.0393
13	4.000	393	0.0393	0.0393
14	8.000	392	0.0392	0.0392
15	10.000	392	0.0392	0.0392
16	20.000	391	0.0391	0.0391
17	40.000	391	0.0391	0.0391
18	80.000	390	0.0390	0.0390
19	100.000	390	0.0390	0.0390
20	200.000	390	0.0390	0.0390
21	400.000	390	0.0390	0.0390
22	800.000	390	0.0390	0.0390
23	1200.000	390	0.0390	0.0390
24	1467.317	390	0.0390	0.0390

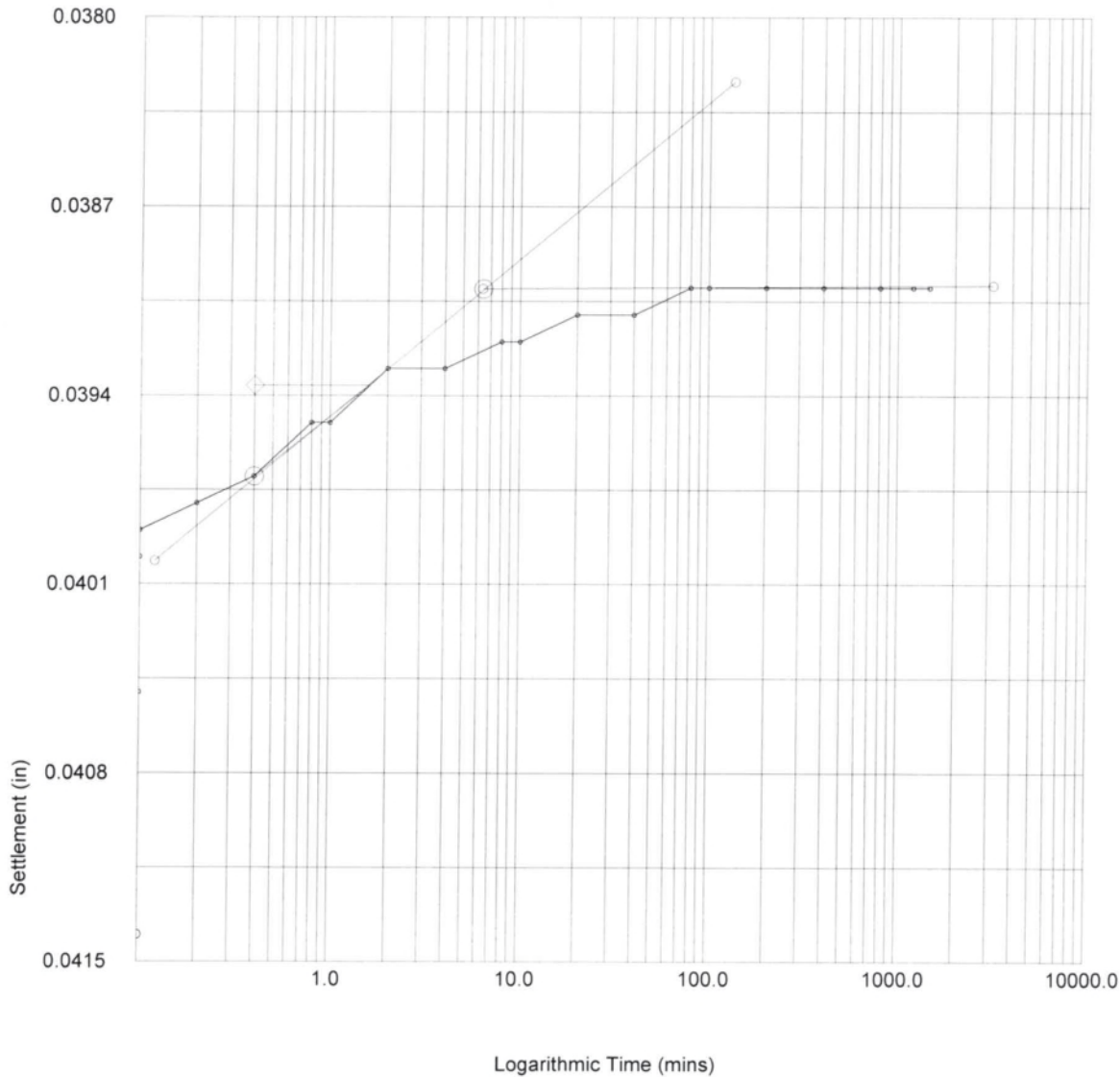


ASTM D2435-96		Test name	Consolidation Load: 2.000 (TSF)
Site Reference: C.F. Harvey		Date of Test:	12-16-16
Jobfile: E:\16010.JOB		Sample:	ST-13
Operator: MK		Borehole:	Y1RPA-1606
Checked: MK		Approved:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF) 2.000  
Initial Temp oC 21.6  
Correction (in) 0.0  
Settlement (in) 0.0024  
Voids Ratio e 0.6391  
Final Temp oC  
t<sub>50</sub> (mins)  
c<sub>v</sub> (ft<sup>2</sup>/day)  
m<sub>v</sub> (ft<sup>2</sup>/ton)  
Sec Compression C<sub>sec</sub>



ASTM D2435-96

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: MK

Test name Consolidation  
Date of Test: 12-16-16

Sample: ST-13  
Borehole: Y1RPA-1606

Checked: MK

Approved:

Oedometer Settlement Tests

No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	390	0.0390	0.0390
2	0.017	387	0.0387	0.0387
3	0.033	383	0.0383	0.0383
4	0.050	382	0.0382	0.0382
5	0.067	376	0.0376	0.0376
6	0.083	375	0.0375	0.0375
7	0.100	375	0.0375	0.0375
8	0.200	373	0.0373	0.0373
9	0.400	370	0.0370	0.0370
10	0.800	368	0.0368	0.0368
11	1.000	367	0.0367	0.0367
12	2.000	362	0.0362	0.0362
13	4.000	359	0.0359	0.0359
14	8.000	352	0.0352	0.0352
15	10.000	350	0.0350	0.0350
16	20.000	344	0.0344	0.0344
17	40.000	338	0.0338	0.0338
18	80.000	334	0.0334	0.0334
19	100.000	333	0.0333	0.0333
20	196.330	331	0.0331	0.0331



ASTM D2435-96

Site Reference: C.F. Harvey  
Jobfile: E:\16010.JOB

Operator: MK

Test name Consolidation Load: 0.500 (TSF)  
Date of Test: 12-16-16

Sample: ST-13  
Borehole: Y1RPA-1606

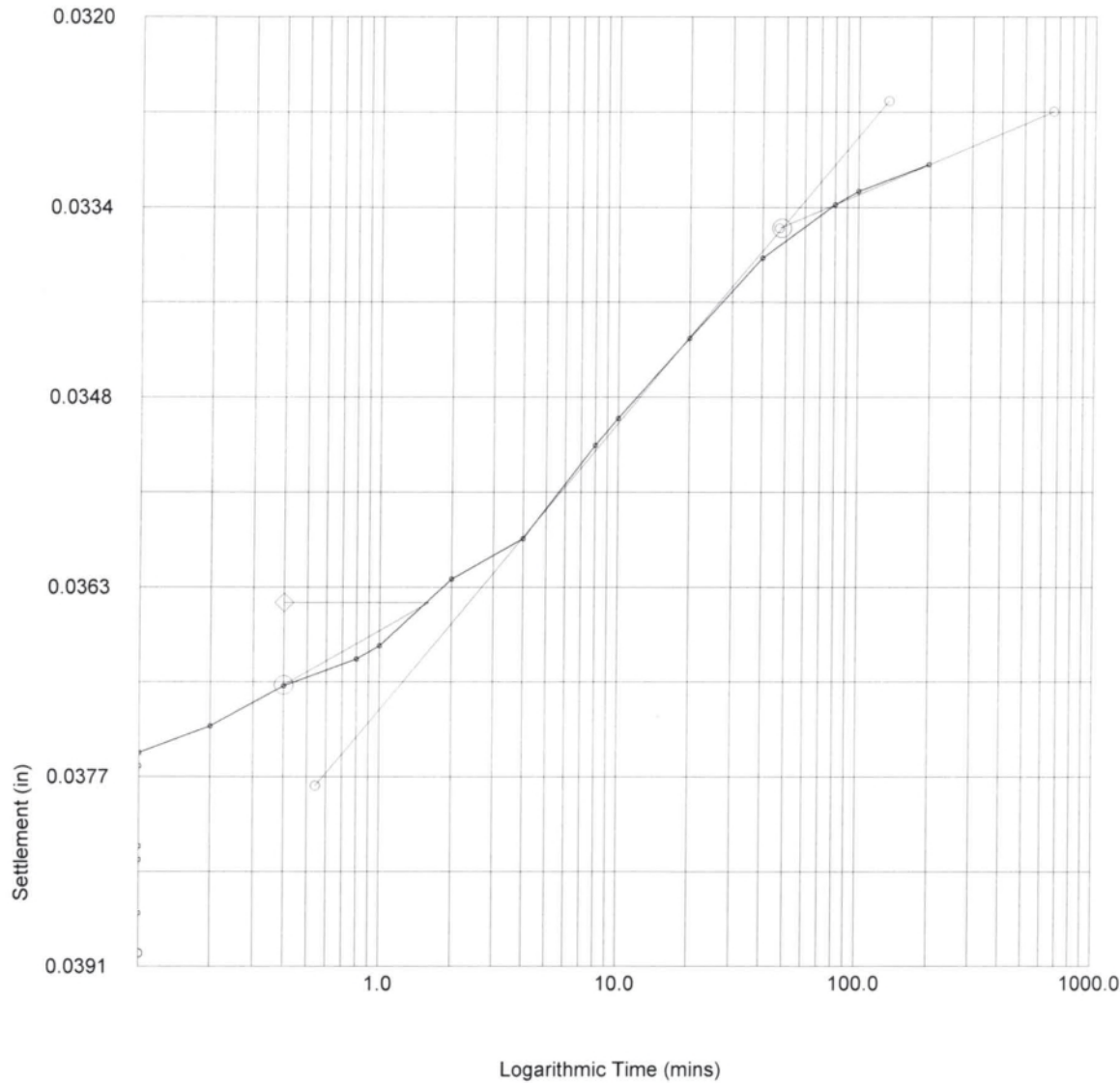
Checked: MK

Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF) 0.500  
Initial Temp oC 21.6  
Correction (in) 0.0  
Settlement (in) 0.0059  
Voids Ratio e 0.6492  
  
Final Temp oC  
t<sub>50</sub> (mins)  
c<sub>v</sub> (ft<sup>2</sup>/day)  
m<sub>v</sub> (ft<sup>2</sup>/ton)  
Sec Compression C<sub>sec</sub>



Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	331	0.0331	0.0331
2	0.017	328	0.0328	0.0328
3	0.033	328	0.0328	0.0328
4	0.050	323	0.0323	0.0323
5	0.067	322	0.0322	0.0322
6	0.083	322	0.0322	0.0322
7	0.100	321	0.0321	0.0321
8	0.200	320	0.0320	0.0320
9	0.400	318	0.0318	0.0318
10	0.800	314	0.0314	0.0314
11	1.000	313	0.0313	0.0313
12	2.000	310	0.0310	0.0310
13	4.000	304	0.0304	0.0304
14	8.000	296	0.0296	0.0296
15	10.000	292	0.0292	0.0292
16	20.000	282	0.0282	0.0282
17	40.000	276	0.0276	0.0276
18	80.000	272	0.0272	0.0272
19	100.000	271	0.0271	0.0271
20	200.000	269	0.0269	0.0269
21	246.130	268	0.0268	0.0268

	ASTM D2435-96		Test name	Consolidation	Load: 0.050 (TSF)
	Site Reference: C.F. Harvey		Date of Test:	12-16-16	
	Jobfile: E:\16010.JOB		Sample:	ST-13	
	Operator: <i>ML</i>		Borehole:	Y1RPA-1606	
	Checked: <i>ML</i>	Approved:			

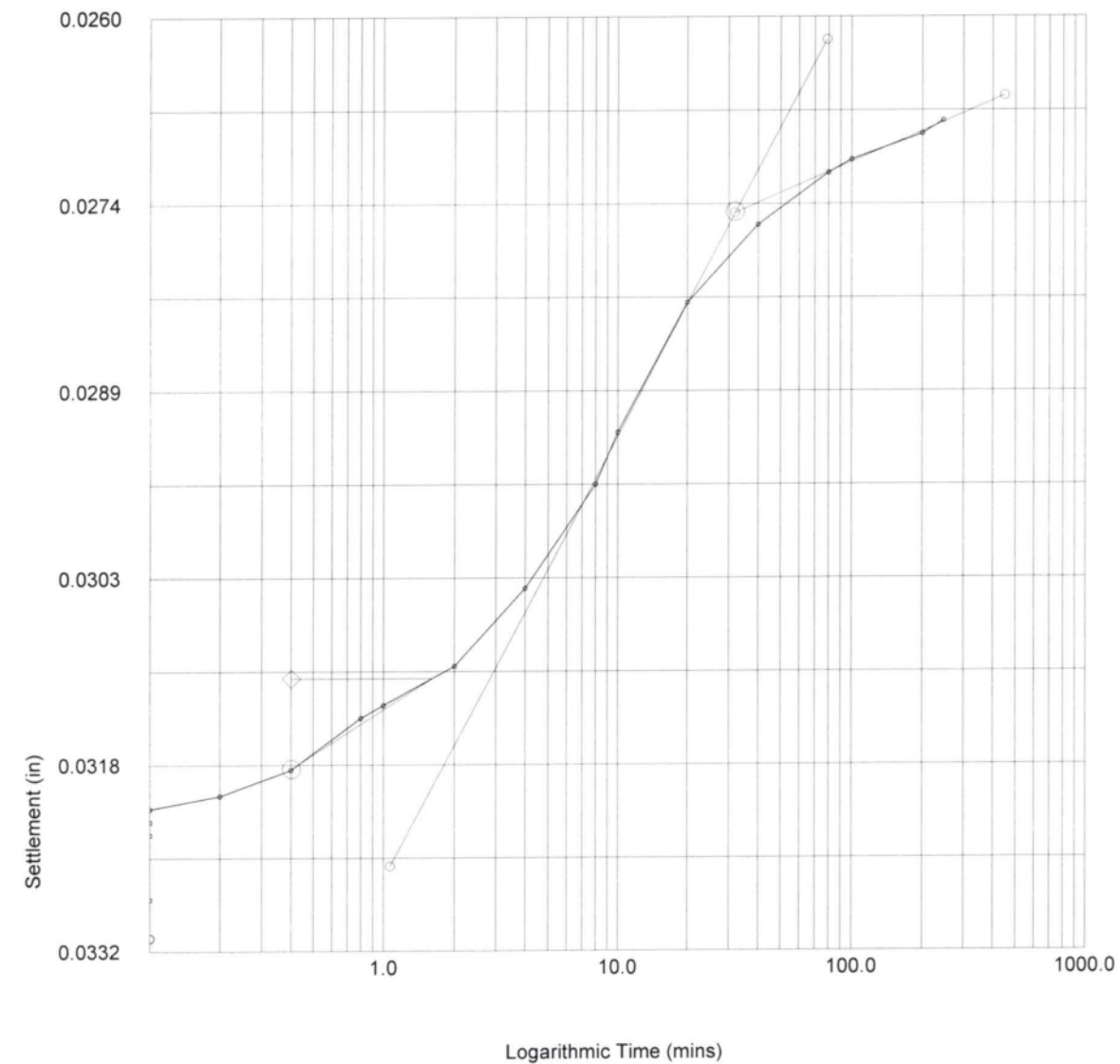


# Oedometer Settlement Tests

## Settlement Stage Results

Vertical Stress (TSF) 0.050  
Initial Temp oC 21.6  
Correction (in) 0.0  
Settlement (in) 0.0063  
Voids Ratio e 0.6600

Final Temp oC  
t<sub>50</sub> (mins)  
c<sub>v</sub> (ft<sup>2</sup>/day)  
m<sub>v</sub> (ft<sup>2</sup>/ton)  
Sec Compression C<sub>sec</sub>



Form No. TR-T88

Revision No. 0

Revision Date: 12/20/09

## Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT

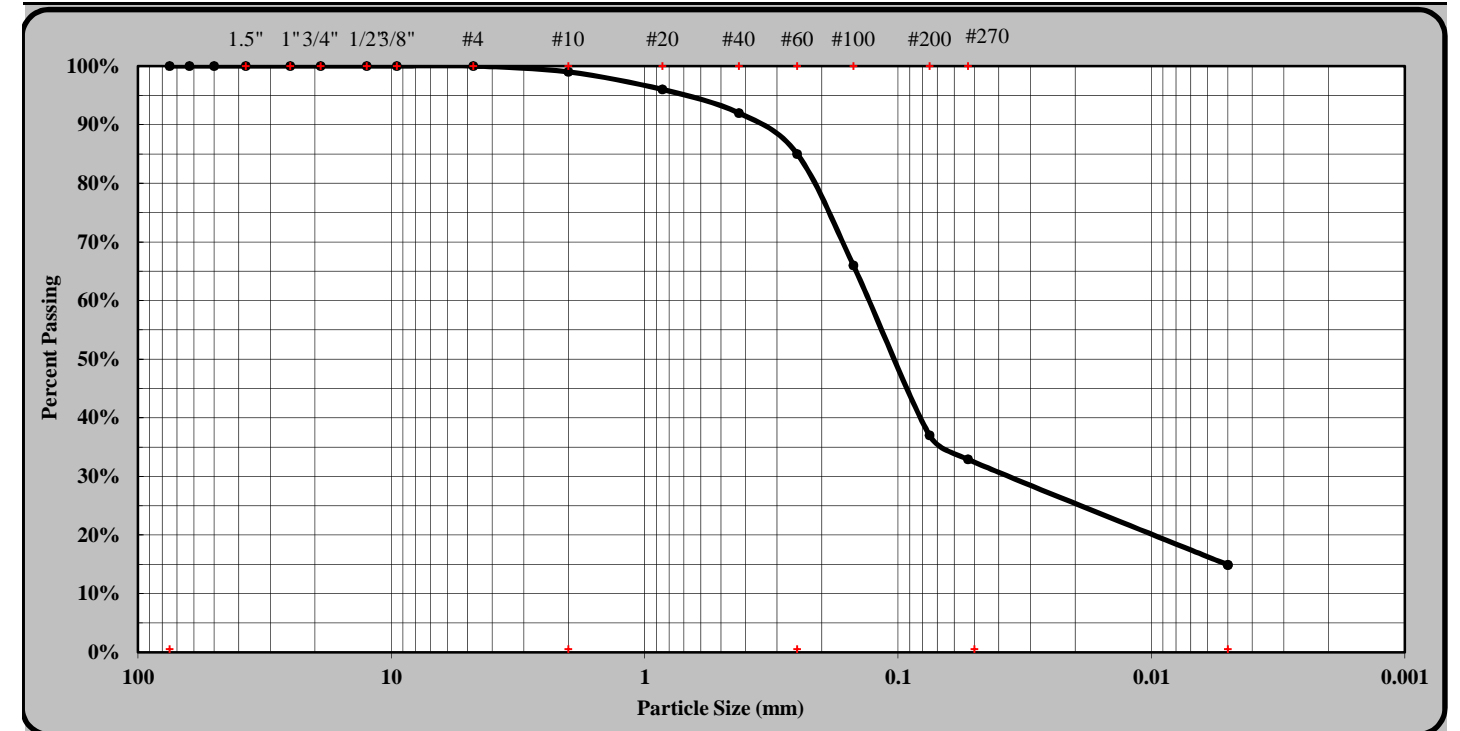
Page 353 of 368



Quality Assurance

**S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616**

S&ME Project #:	6235-16-010	Report Date:	11/3/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 1/15/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	Y1LPA-1576	Sample #:	SS-81
Location:	15+76	Offset:	10' RT
Sample Description:	Gray Coarse to Fine Sandy Clayey SILT A-4 (0)		
	Sample Date:	9/19/16	
	Depth (ft):	2.0 - 3.5	



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and > 0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	3/8"	Coarse Sand	14%	Silt	18%
Gravel	1%	Fine Sand	52%	Clay	15%
Apparent Relative Density	ND	Moisture Content	21.4%	% Passing #200	37.0%
Liquid Limit	15	Plastic Limit	12	Plastic Index	3
Soil Mortar (-#10 Sieve)					
Coarse Sand	14%	Fine Sand	53%	Silt	18%
				Clay	15%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>		Angular	<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

Position

11/3/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

9/26/2016

Date

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ASTM D2435-96	Test name	Consolidation
Site Reference: C.F. Harvey	Date of Test:	12-16-16
Jobfile: E:\16010.JOB	Sample:	ST-13
Operator: MK	Borehole:	Y1RPA-1606
Checked: MK	Approved:	

S&ME, Inc.

3201 Spring Forest Road  
Raleigh, NC 27616

1200.Y1LPA-1576 SS-81 (2 - 3.5 ft) Classification.xls



Form No. TR-D698-2

Revision No. : 0

Revision Date: 11/21/07

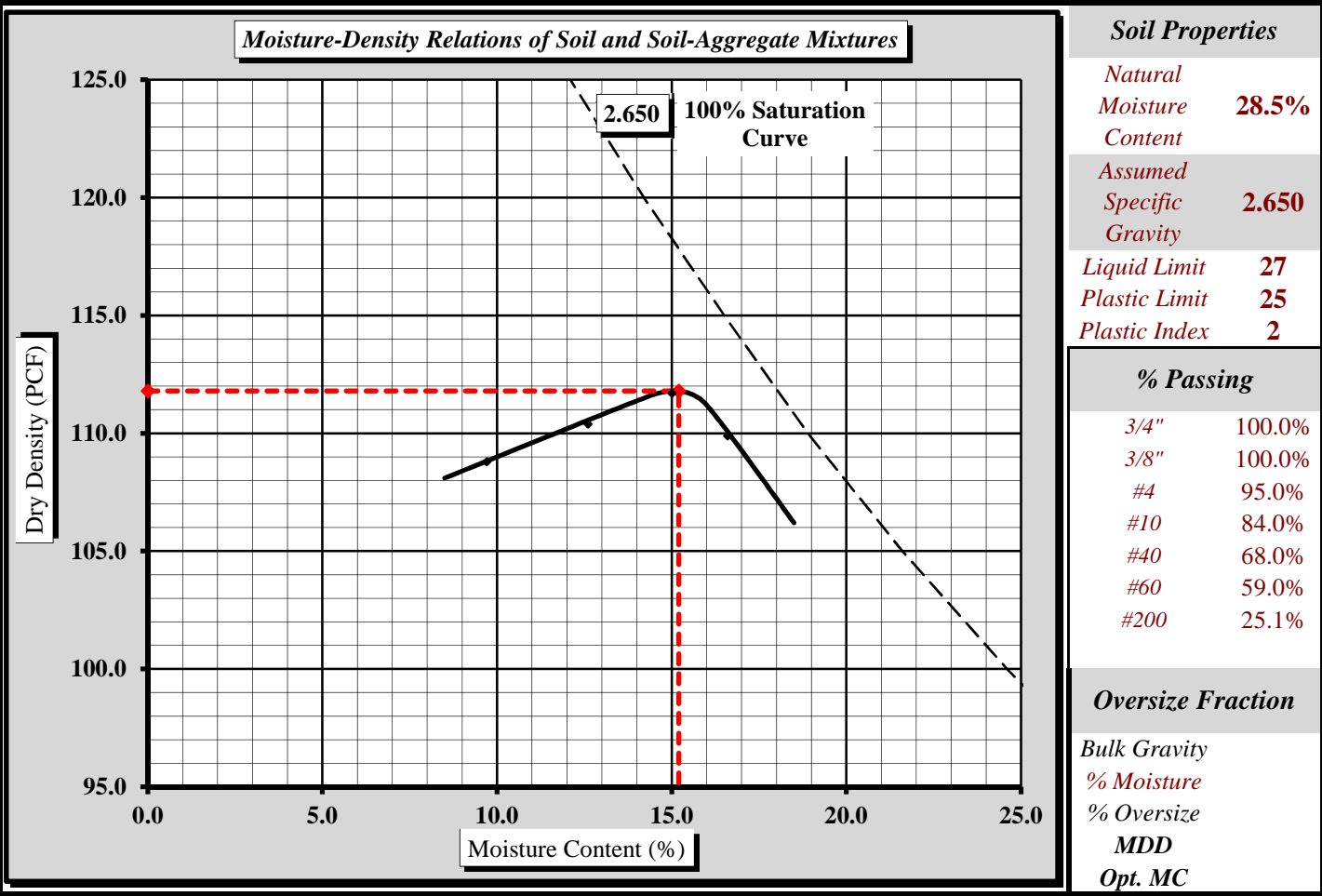
Moisture - Density Report



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	10/12/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	9/30 - 10/7/16
Client Name:	Michael Baker		
Client Address:	Cary, NC		
Boring #:	Y1RPD-1308	Sample #:	CBR-6
Location:	13+08	Sample Date:	9/22/2016
	Offset:	2'RT	Depth:
			1.0 - 3.0 ft
Sample Description:	Dark Gray Silty Clayey Coarse to Fine SAND (A-2-4) (0)		

Maximum Dry Density	111.8	PCF.	Optimum Moisture Content	15.2%
AASHTO T99 - - Method A				



Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: ND=Not Determined.

ASTM D 422: Particle Size Analysis of Soils

ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Mal Krajan, ET		Laboratory Manager	
Technical Responsibility	Signature	Position	Date
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Form No. TR-D1833-T193-3

Revision No. 0

Revision Date: 2/6/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

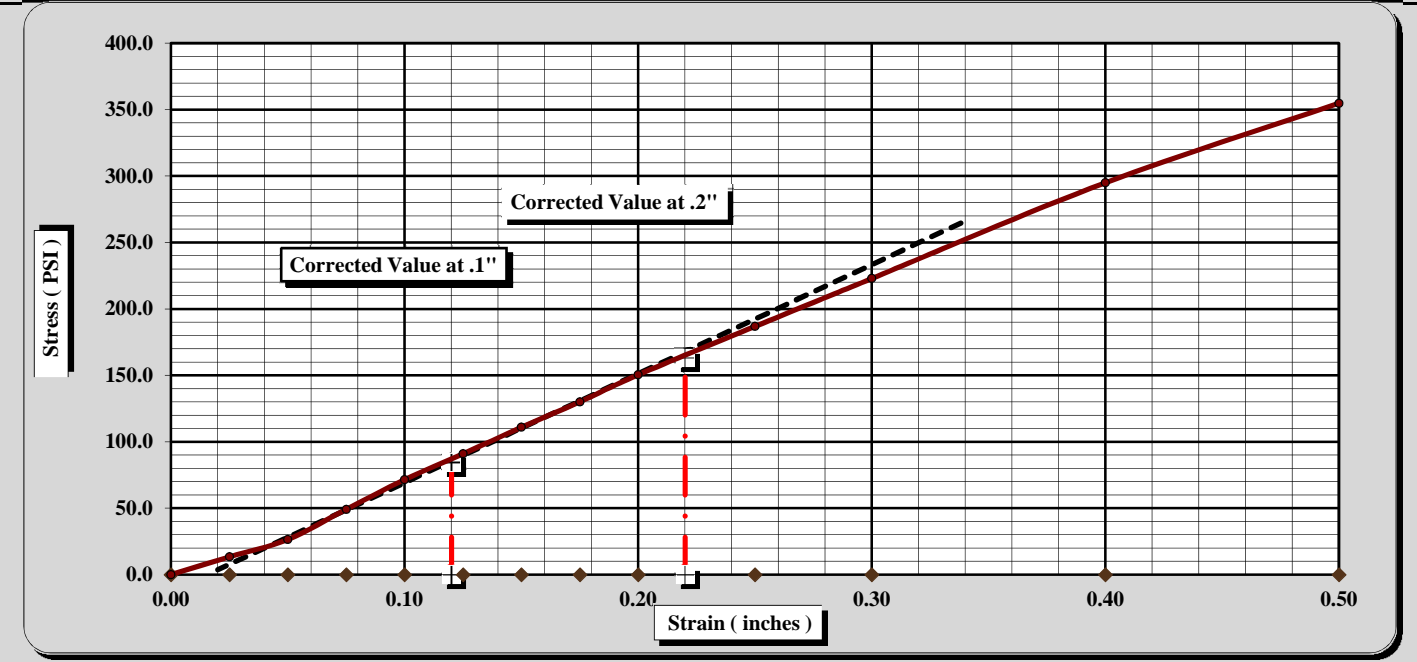


Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
Project #:	6235-16-010	Report Date:	10/12/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s)	10/5 - 10/12/16
Client Name:	Michael Baker		
Client Address:	Cary, NC		
Boring #:	Y1RPD-1308	Sample #:	CBR-6
Location:	13+08	Sample Date:	9/22/16
	Offset:	2' RT	Depth (ft):
			1.0 - 3.0 ft
Sample Description:	Dark Gray Silty Clayey Coarse to Fine SAND (A-2-4) (0)		

AASHTO T99 Method A	Maximum Dry Density:	111.8	PCF	Optimum Moisture Content:	15.2%
Compaction Test performed on grading complying with CBR spec.				% Retained on the 3/4" sieve:	0.0%

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in.	7.2	CBR at 0.1 in.	8.5
CBR at 0.2 in.	10.0	CBR at 0.2 in.	10.9



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	65	Final Dry Density (PCF)	112.1
Initial Dry Density (PCF)	111.9	Average Final Moisture Content	15.3%
Moisture Content of the Compacted Specimen	15.5%	Moisture Content (top 1" after soaking)	15.7%
Percent Compaction	100.1%	Percent Swell	-0.1%
Soak Time:	96-hr	Surcharge Weight	10.0
Liquid Limit	27	Surcharge Wt. per sq. Ft.	50.9
		Plastic Index	2

Notes/Deviations/References:

Test specimen was compacted to 100% at optimum moisture content.

Mal Krajan, ET		Laboratory Manager	11/12/2016
Technical Responsibility	Signature	Position	Date
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Form No. TR-T88

Revision No. 0

Revision Date: 12/20/09

Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 11/3/16

Project Name: C.F. Harvey Parkway Extension R-5703Test Date(s): 10/7 - 11/15/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

Client Name: Michael Baker Engineering

Address: Raleigh, NC

Boring #: Y1LPD-1596Sample #: SS-83Sample Date: 8/9/16

Location: 15+96Offset: 16' RTDepth (ft): 2.5 - 4.0

Sample Description: Gray Coarse to Fine Sandy Silty CLAY A-7-6 (18)

1.5"1"3/4"1/23/8"#4#10#20#40#60#100#200#270

100%90%80%70%60%50%40%30%20%10%0%

1001010.10.010.001

Percent Passing

Particle Size (mm)

As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm		
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm		

Maximum Particle Size	3/8"	Coarse Sand	13%	Silt	9%
Gravel	1%	Fine Sand	28%	Clay	49%
Apparent Relative Density	ND	Moisture Content	30.3%	% Passing #200	61.5%
Liquid Limit	54	Plastic Limit	20	Plastic Index	34

Soil Mortar (-#10 Sieve)

Coarse Sand	13%	Fine Sand	29%	Silt	9%	Clay	49%
-------------	-----	-----------	-----	------	----	------	-----

Description of Sand & Gravel Particles:

	Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>	
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations:

ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

Position

11/3/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

9/26/2016

Date

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3201 Spring Forest Road

Raleigh, NC 27616

1400.Y1LPD-1596 SS-83 (2.5 - 4 ft) Classification.xls

Form No. TR-T88

Revision No. 0

Revision Date: 12/20/09

Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 9/20/16

Project Name: C.F. Harvey Parkway Extension R-5703Test Date(s): 9/12 - 9/20/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

Client Name: Michael Baker Engineering

Address: Raleigh, NC

Boring #: Y8-2315Sample #: SS-115Sample Date: 8/22/16

Location: 23+15Offset: 22' LTDepth (ft): 4.0 - 5.5

Sample Description: Tan-Brown Coarse to Fine Sandy Silty CLAY A-6 (10)

1.5"1"3/4"1/23/8"#4#10#20#40#60#100#200#270

100%90%80%70%60%50%40%30%20%10%0%

1001010.10.010.001

Percent Passing

Particle Size (mm)

As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm		
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm		

Maximum Particle Size	#4	Coarse Sand	5%	Silt	26%
Gravel	0%	Fine Sand	38%	Clay	31%
Apparent Relative Density	ND	Moisture Content	21.9%	% Passing #200	65.7%
Liquid Limit	34	Plastic Limit	15	Plastic Index	19

Soil Mortar (-#10 Sieve)

Coarse Sand	5%	Fine Sand	38%	Silt	26%	Clay	31%
-------------	----	-----------	-----	------	-----	------	-----

Description of Sand & Gravel Particles:

	Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>	
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input checked="" type="checkbox"/>	Weathered & Friable	<input checked="" type="checkbox"/>

References / Comments / Deviations:

ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

Position

9/12/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

9/26/2016

Date

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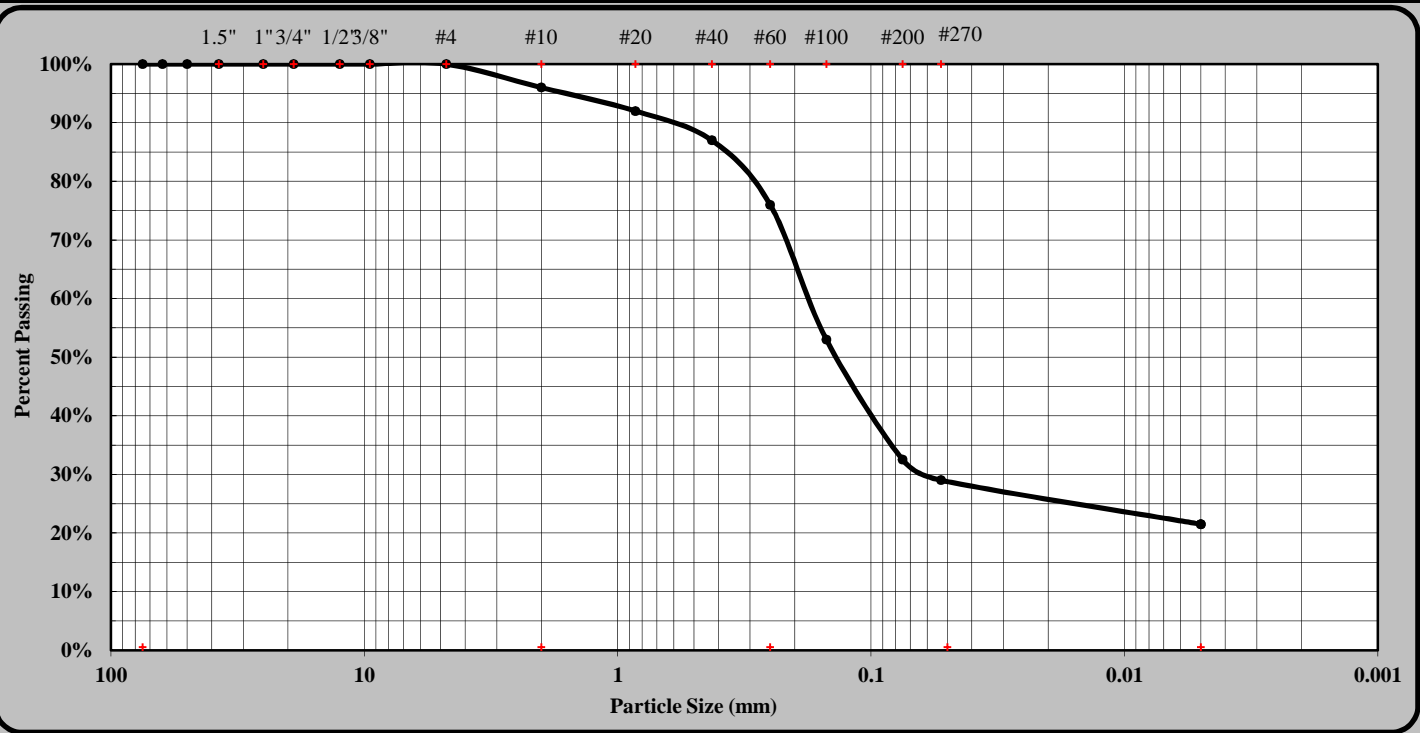
3201 Spring Forest Road

Raleigh, NC 27616

1500.Y8-2315 SS-115 (4 - 5.5 ft) Classification.xls




S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	9/20/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	9/12 - 9/20/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	Y8-5290	Sample #:	SS-116
Location:	52+90	Sample Date:	8/22/16
		Offset:	25' LT
		Depth (ft):	2.0 - 3.5
Sample Description:	Brown Silty Clayey Coarse to Fine SAND A-2-6 (0)		

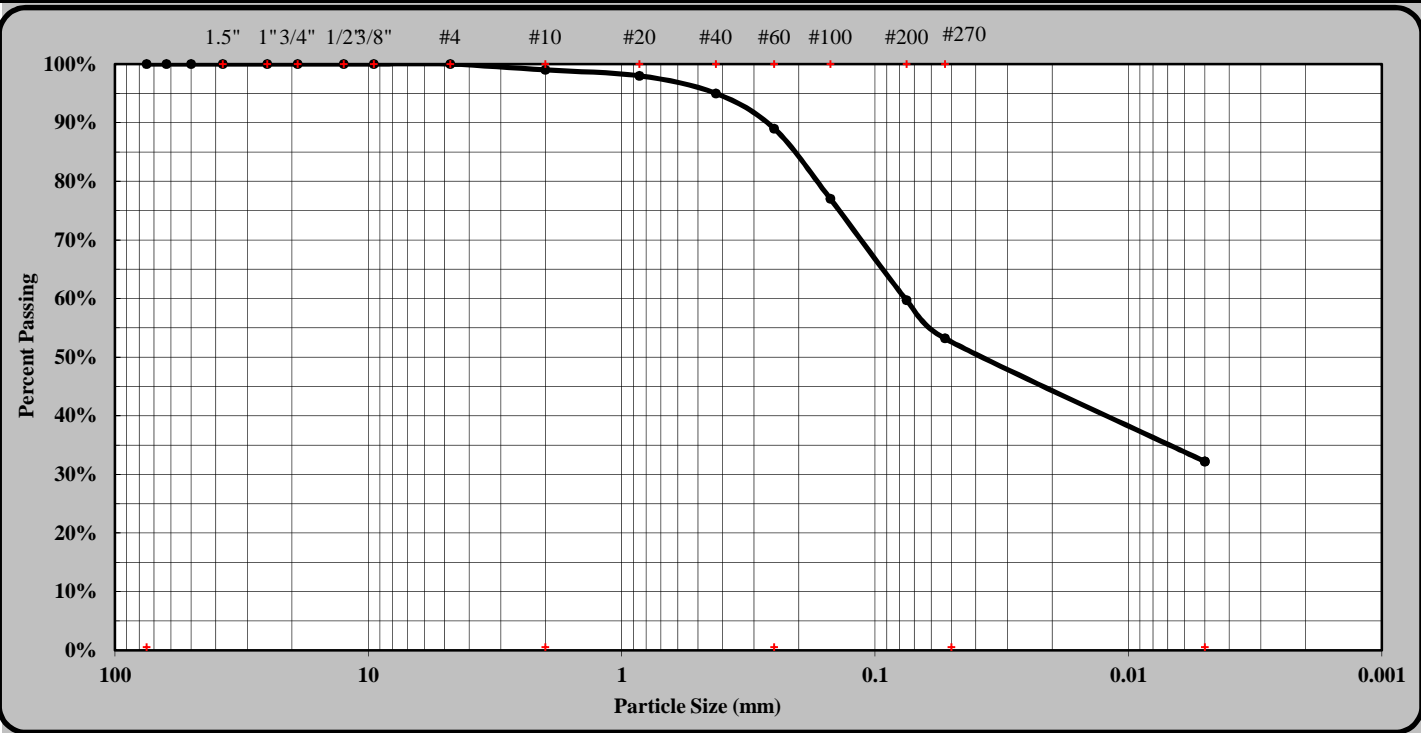


As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#4	Coarse Sand	20%	Silt	8%
Gravel	4%	Fine Sand	47%	Clay	22%
Apparent Relative Density	ND	Moisture Content	21.0%	% Passing #200	32.5%
Liquid Limit	28	Plastic Limit	15	Plastic Index	13
Soil Mortar (-#10 Sieve)					
Coarse Sand	21%	Fine Sand	49%	Silt	8%
				Clay	22%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>	
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input checked="" type="checkbox"/>	Weathered & Friable	<input checked="" type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	9/12/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	9/26/2016
Technical Responsibility	Signature	Position	Date
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	9/20/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	9/12 - 9/20/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	Y8-5915	Sample #:	SS-117
Location:	59+15	Sample Date:	8/26/16
		Offset:	75' RT
		Depth (ft):	2.0 - 3.5
Sample Description:	Dark Gray Coarse to Fine Sandy Silty CLAY A-6 (7)		



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#4	Coarse Sand	10%	Silt	21%
Gravel	1%	Fine Sand	36%	Clay	32%
Apparent Relative Density	ND	Moisture Content	22.0%	% Passing #200	59.7%
Liquid Limit	30	Plastic Limit	13	Plastic Index	17
Soil Mortar (-#10 Sieve)					
Coarse Sand	10%	Fine Sand	36%	Silt	21%
				Clay	33%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>	
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input checked="" type="checkbox"/>	Weathered & Friable	<input checked="" type="checkbox"/>

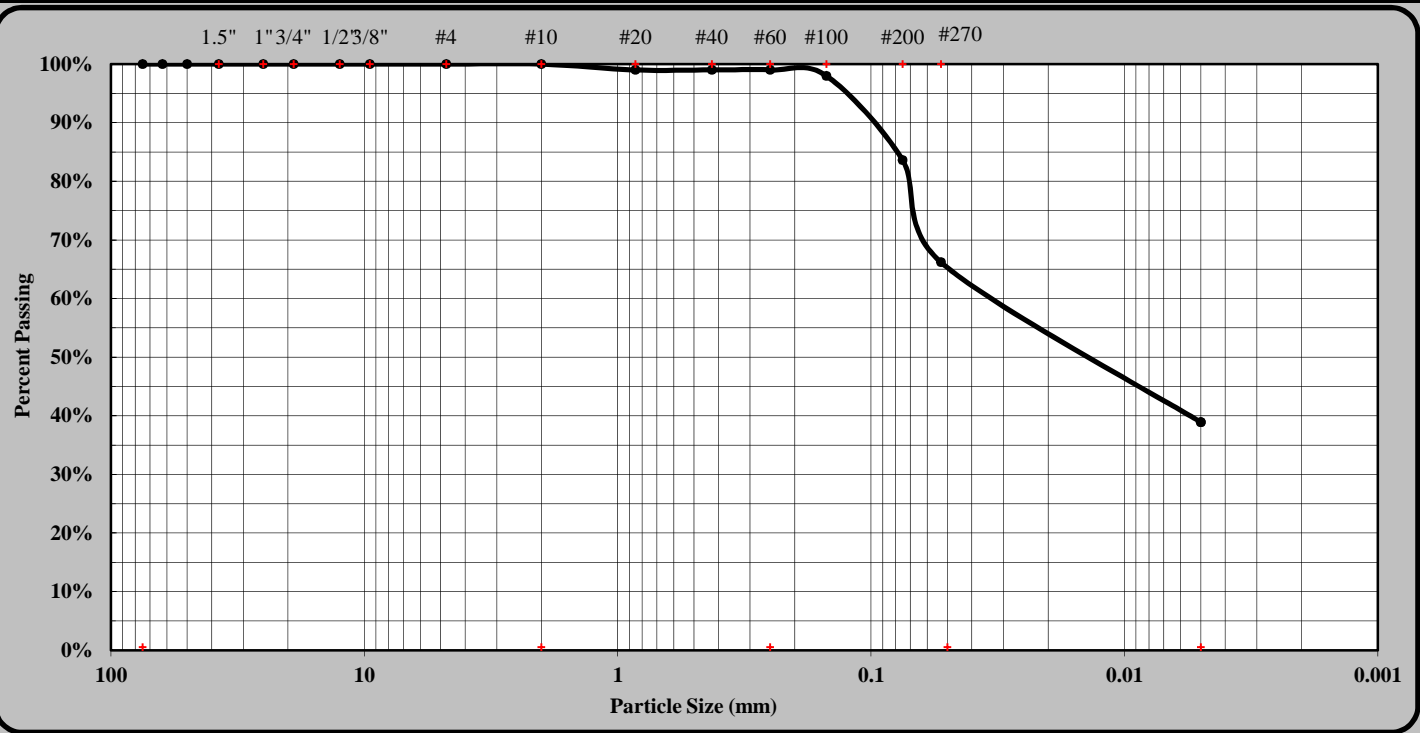
References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	9/12/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	9/26/2016
Technical Responsibility	Signature	Position	Date
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	10/5/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	9/28 - 10/5/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	Y8RPA-2195	Sample #:	SS-96
Location:	21+95	Sample Date:	9/15/16
		Offset:	87' RT
		Depth (ft):	14.0 - 15.5
Sample Description:	Dark Gray Coarse to Fine Sandy Silty CLAY A-7-5 (34)		

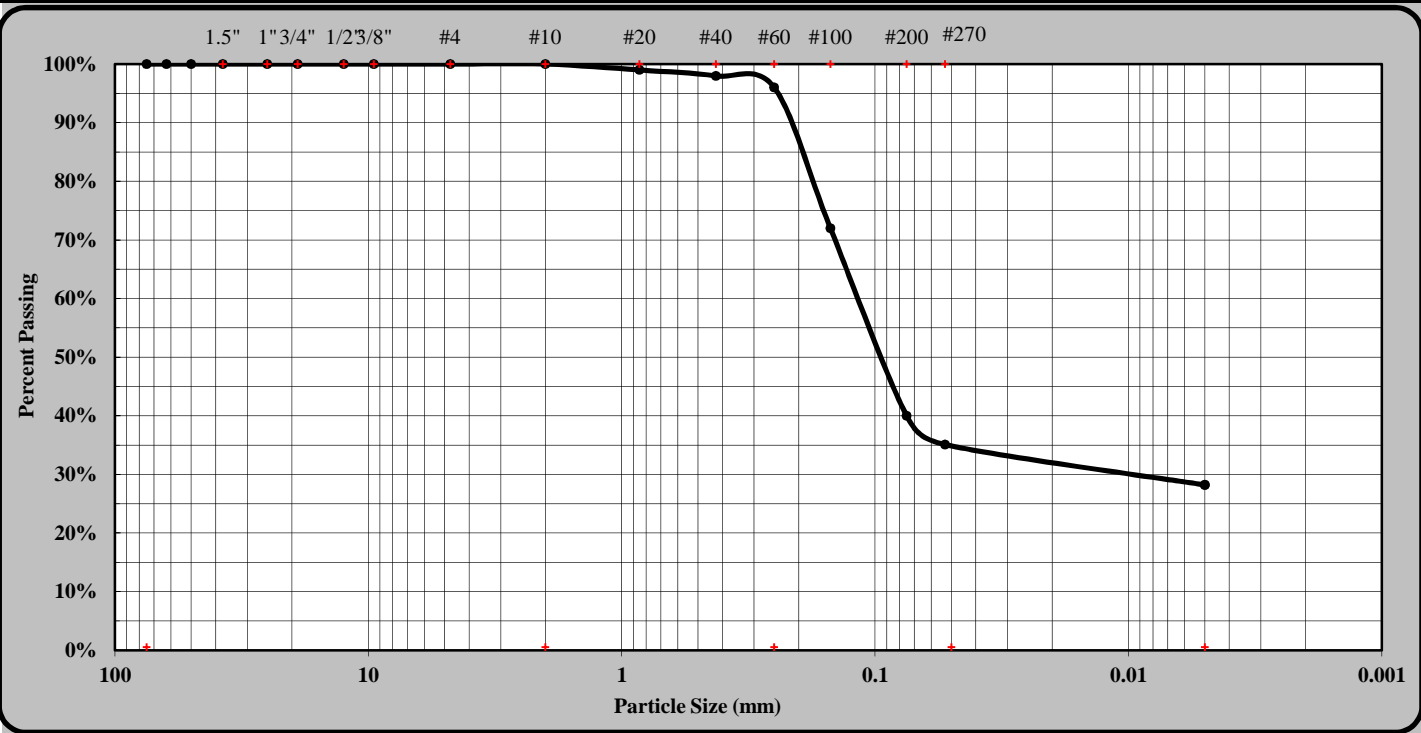


As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#10	Coarse Sand	1%	Silt	27%
Gravel	0%	Fine Sand	33%	Clay	39%
Apparent Relative Density	ND	Moisture Content	42.1%	% Passing #200	83.6%
Liquid Limit	67	Plastic Limit	31	Plastic Index	36
Soil Mortar (-#10 Sieve)					
Coarse Sand	1%	Fine Sand	33%	Silt	27%
				Clay	39%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>	
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	9/12/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	9/26/2016
Technical Responsibility	Signature	Position	Date
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	10/5/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	9/28 - 10/5/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	Y8RPB-1033	Sample #:	SS-97
Location:	10+33	Sample Date:	9/13/16
		Offset:	2' LT
		Depth (ft):	2.0 - 3.5
Sample Description:	Brown Coarse to Fine Sandy Silty CLAY A-7-6 (7)		




As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#4	Coarse Sand	4%	Silt	7%
Gravel	0%	Fine Sand	61%	Clay	28%
Apparent Relative Density	ND	Moisture Content	28.2%	% Passing #200	40.0%
Liquid Limit	49	Plastic Limit	14	Plastic Index	35
Soil Mortar (-#10 Sieve)					
Coarse Sand	4%	Fine Sand	61%	Silt	7%
				Clay	28%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>	
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	9/12/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	9/26/2016
Technical Responsibility	Signature	Position	Date
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Form No. TR-T88  
Revision No. 0  
Revision Date: 12/20/09

Particle Size Analysis of Soils  
AASHTO T88 as Modified by NCDOT



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 10/5/16

Project Name: C.F. Harvey Parkway Extension R-5703Test Date(s): 9/28 - 10/5/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

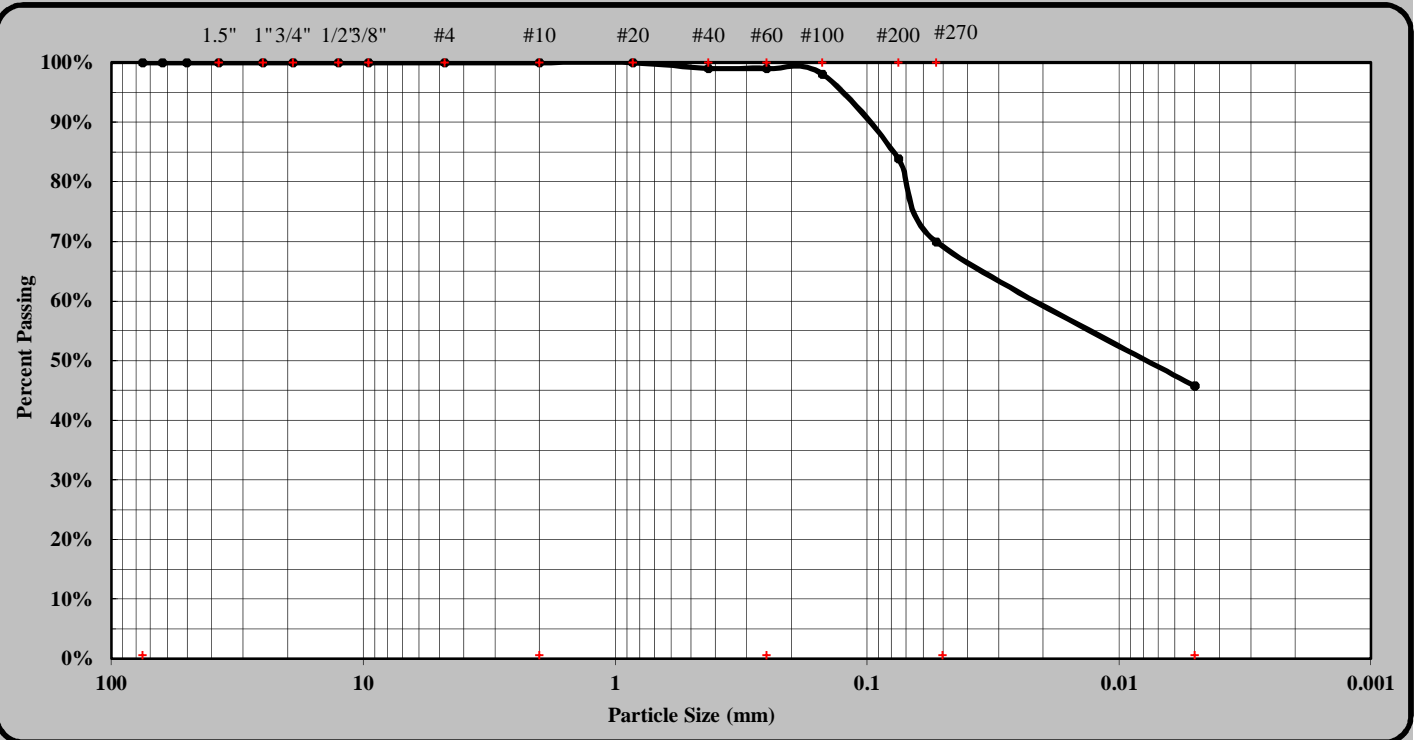
Client Name: Michael Baker Engineering

Address: Raleigh, NC

Boring #: Y8RPB-1934Sample #: SS-98Sample Date: 9/13/16

Location: 19+34Offset: 16' RTDepth (ft): 8.7 - 10.2

Sample Description: Dark Gray Coarse to Fine Sandy Silty CLAY A-7-5 (22)



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm		
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm		

Maximum Particle Size	#10	Coarse Sand	1%	Silt	24%
Gravel	0%	Fine Sand	29%	Clay	46%
Apparent Relative Density	ND	Moisture Content	ND	% Passing #200	83.8%
Liquid Limit	77	Plastic Limit	62	Plastic Index	15

Soil Mortar (-#10 Sieve)							
Coarse Sand	1%	Fine Sand	29%	Silt	24%	Clay	46%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular		<input type="checkbox"/>	
Hard & Durable		<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable		<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.


Mal Krajan, ET  
Technician Name

104-01-0703  
Certification No.

Laboratory Manager  
Position

9/12/2016  
Date

Mal Krajan, ET  
Technical Responsibility

  
Signature

Laboratory Manager  
Position

9/26/2016  
Date

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3201 Spring Forest Road  
Raleigh, NC 27616

Y8RPB-1934 SS-98 (8.7 - 10.2 ft) Classification.xls

Form No. TR-T88  
Revision No. 0  
Revision Date: 12/20/09

Particle Size Analysis of Soils  
AASHTO T88 as Modified by NCDOT



Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 11/13/16

Project Name: NC 242 (Harvey Parkway)Test Date(s): 11/1-13/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

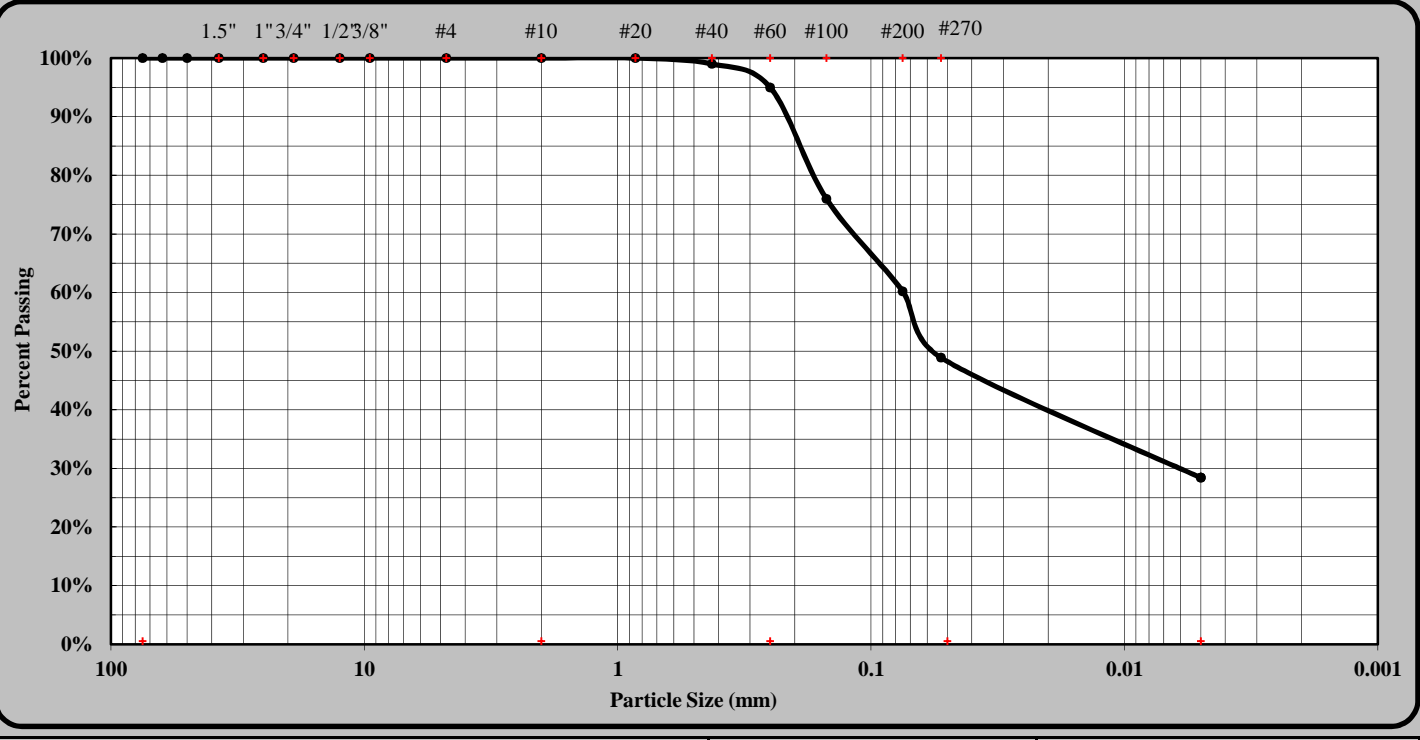
Client Name: NCDOT

Address: Raleigh, NC

Boring #: Y8RPB-2236Sample #: SS-99Sample Date: 9/16/16

Location: 22+36Offset: 39' RTDepth (ft): 0.0-1.5'

Sample Description: Tan Brown Sandy CLAY A-6 (5)



As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm		
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm		

Maximum Particle Size	#10	Coarse Sand	5%	Silt	21%
Gravel	0%	Fine Sand	46%	Clay	28%
Apparent Relative Density	2.650	Moisture Content	13.1%	% Passing #200	60.2%
Liquid Limit	28	Plastic Limit	15	Plastic Index	13

Soil Mortar (-#10 Sieve)							
Coarse Sand	5%	Fine Sand	46%	Silt	21%	Clay	28%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular		<input checked="" type="checkbox"/>	
Hard & Durable		<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable		<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.


Karen Warner  
Technician Name

118-06-0305  
Certification No.

Laboratory Technician  
Position

11/13/2016  
Date

Stewart Laney  
Technical Responsibility

  
Signature

Project Manager  
Position

Date

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S&ME, Inc.

3201 Spring Forest Road  
Raleigh, NC 27616

1701.Y8RPB-2236 SS-99 (0.0-1.5').xls

Form No. TR-T88  
Revision No. 0  
Revision Date: 12/20/09

Particle Size Analysis of Soils  
AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 10/5/16

Project Name: C.F. Harvey Parkway Extension R-5703Test Date(s): 9/28 - 10/5/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

Client Name: Michael Baker Engineering

Address: Raleigh, NC

Boring #: Y8RPB-2803Sample #: SS-100Sample Date: 9/16/16

Location: 28+03Offset: 35' LTDepth (ft): 3.9 - 5.4

Sample Description: Brown Coarse to Fine Sandy Silty CLAY A-7-6 (28)

100%90%80%70%60%50%40%30%20%10%0%

1001"1 3/4"1 2/3 8"#4#10#20#40#60#100#200#270

Particle Size (mm)

As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm		
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm		

Maximum Particle Size#10Coarse Sand5%Silt10%

Gravel0%Fine Sand37%Clay48%

Apparent Relative DensityNDMoisture Content28.3% % Passing #20067.8%

Liquid Limit66Plastic Limit23Plastic Index43

Soil Mortar (-#10 Sieve)

Coarse Sand5%Fine Sand37%Silt10%Clay48%

Description of Sand & Gravel Particles:

Rounded☐

Angular☐

Hard & Durable☐Soft☐Weathered & Friable☐

References / Comments / Deviations:ND=Not Determined.

Mal Krajan, ET  
Technician Name

104-01-0703  
Certification No.

Laboratory Manager  
Position

9/12/2016  
Date

Mal Krajan, ET  
Technical Responsibility

Signature

Laboratory Manager  
Position

9/26/2016  
Date

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S&ME, Inc.

3201 Spring Forest Road  
Raleigh, NC 27616 1702.Y8RPB-2803 SS-100 (3.9 - 5.4 ft) Classification.xls

Form No. TR-T88  
Revision No. 0  
Revision Date: 12/20/09

Particle Size Analysis of Soils  
AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 10/5/16

Project Name: C.F. Harvey Parkway Extension R-5703Test Date(s): 9/28 - 10/5/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

Client Name: Michael Baker Engineering

Address: Raleigh, NC

Boring #: Y8RPB-2803Sample #: SS-101Sample Date: 9/16/16

Location: 28+03Offset: 35' LTDepth (ft): 5.9 - 7.4

Sample Description: Gray-Brown Coarse to Fine Sandy Silty CLAY A-7-6 (22)

100%90%80%70%60%50%40%30%20%10%0%

1001"1 3/4"1 2/3 8"#4#10#20#40#60#100#200#270

Particle Size (mm)

As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm		
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm		

Maximum Particle Size#10Coarse Sand4%Silt10%

Gravel0%Fine Sand43%Clay43%

Apparent Relative DensityNDMoisture Content23.9% % Passing #20061.5%

Liquid Limit59Plastic Limit18Plastic Index41

Soil Mortar (-#10 Sieve)

Coarse Sand4%Fine Sand43%Silt10%Clay43%

Description of Sand & Gravel Particles:

Rounded☐

Angular☐

Hard & Durable☐Soft☐Weathered & Friable☐

References / Comments / Deviations:ND=Not Determined.

Mal Krajan, ET  
Technician Name

104-01-0703  
Certification No.

Laboratory Manager  
Position

9/12/2016  
Date

Mal Krajan, ET  
Technical Responsibility

Signature

Laboratory Manager  
Position

9/26/2016  
Date

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S&ME, Inc.

3201 Spring Forest Road  
Raleigh, NC 27616 1703.Y8RPB-2803 SS-101 (5.9 - 7.4 ft) Classification.xls

Form No. TR-T88

Revision No. 0

Revision Date: 12/20/09

Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 9/20/16

Project Name: C.F. Harvey Parkway Extension R-5703Test Date(s): 9/12 - 9/20/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

Client Name: Michael Baker Engineering

Address: Raleigh, NC

Boring #: Y8LPC-1089Sample #: SS-89Sample Date: 8/24/16

Location: 10+89Offset: 5' RTDepth (ft): 3.6 - 5.1

Sample Description: Tan-Brown Coarse to Fine Sandy Silty CLAY A-7-6 (21)

1.5"1"3/4"1/23/8"#4#10#20#40#60#100#200#270

100%90%80%70%60%50%40%30%20%10%0%

Percent Passing

1001010.10.010.001

Particle Size (mm)

As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm		
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm		

Maximum Particle Size	#4	Coarse Sand	4%	Silt	11%
Gravel	0%	Fine Sand	39%	Clay	46%
Apparent Relative Density	ND	Moisture Content	ND	% Passing #200	61.2%
Liquid Limit	60	Plastic Limit	22	Plastic Index	38

Soil Mortar (-#10 Sieve)

Coarse Sand	4%	Fine Sand	39%	Silt	11%	Clay	46%
-------------	----	-----------	-----	------	-----	------	-----

Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>	
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input checked="" type="checkbox"/>	Weathered & Friable	<input checked="" type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET

Technician Name

104-01-0703

Certification No.

Laboratory Manager

Position

9/12/2016

Date

Mal Krajan, ET

Technical Responsibility

Signature

Laboratory Manager

Position

9/26/2016

Date

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3201 Spring Forest Road

Raleigh, NC 27616

1800.Y8LPC-1089 SS-89 (3.6 - 5.1 ft) Classification.xls

Form No. TR-T88

Revision No. 0

Revision Date: 12/20/09

Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #: 6235-16-010Report Date: 11/13/16

Project Name: NC 242 (Harvey Parkway)Test Date(s): 11/1-13/16

State Project #: 46375.1.1F.A. Project No: N/ATIP NO: R-5703

Client Name: NCDOT

Address: Raleigh, NC

Boring #: Y8LPC-1976Sample #: SS-90Sample Date: 9/19/16

Location: 19+76Offset: 5' LTDepth (ft): 14.2-15.7'

Sample Description: Sandy SILT A-4 (0)

1.5"1"3/4"1/23/8"#4#10#20#40#60#100#200#270

100%90%80%70%60%50%40%30%20%10%0%

Percent Passing

1001010.10.010.001

Particle Size (mm)

As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm		
Coarse Sand	< 2.00 mm and >0.25 mm	Clay	< 0.005 mm		

Maximum Particle Size	1/2"	Coarse Sand	28%	Silt	15%
Gravel	11%	Fine Sand	24%	Clay	22%
Apparent Relative Density	2.650	Moisture Content	56.2%	% Passing #200	38.4%
Liquid Limit	31	Plastic Limit	22	Plastic Index	9

Soil Mortar (-#10 Sieve)

Coarse Sand	32%	Fine Sand	26%	Silt	17%	Clay	25%
-------------	-----	-----------	-----	------	-----	------	-----

Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>	
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Karen Warner

Technician Name

118-06-0305

Certification No.

Laboratory Technician

Position

11/13/2016

Date

Stewart Laney

Technical Responsibility

Signature

Project Manager

Position

Date

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3201 Spring Forest Road

Raleigh, NC 27616

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1801.Y8LPC-1976 SS-90 (14.2-15.7').xls



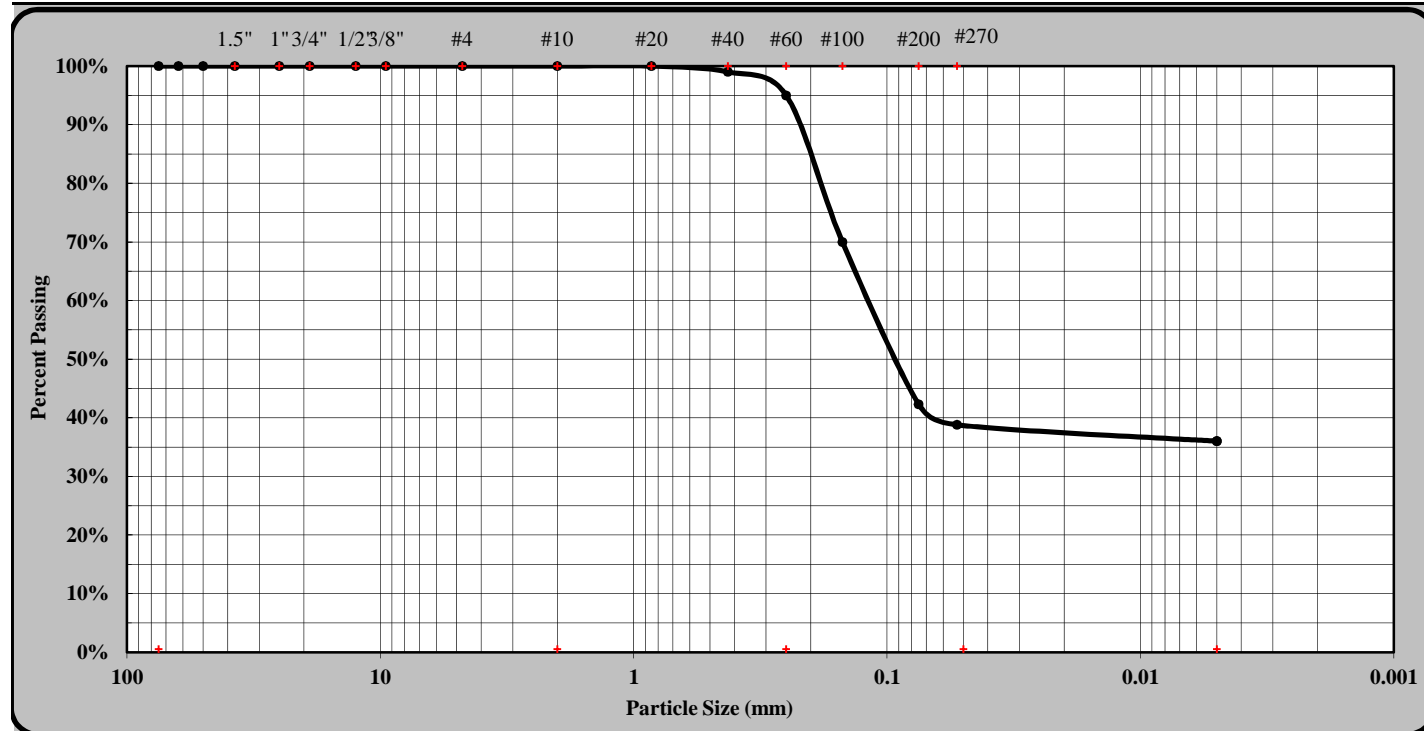
## Particle Size Analysis of Soils

*AASHTO T88 as Modified by NCDOT*



## Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616				
S&ME Project #:	6235-16-010		Report Date:	10/5/16
Project Name:	C.F. Harvey Parkway Extension R-5703		Test Date(s):	9/28 - 10/5/16
State Project #:	46375.1.1	F.A. Project No:	N/A	TIP NO: R-5703
Client Name:	Michael Baker Engineering			
Address:	Raleigh, NC			
Boring #:	Y8LPD-1128	Sample #:	SS-93	Sample Date: 9/19/16
Location:	11+28	Offset:	5' RT	Depth (ft): 4.0 - 5.5
Sample Description:	Brown Coarse to Fine Sandy Silty CLAY A-7-6 (7)			



As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm
Coarse Sand	< 2.00 mm and > 0.25 mm	Clay	< 0.005 mm

Maximum Particle Size	#10	Coarse Sand	5%	Silt	3%
Gravel	0%	Fine Sand	56%	Clay	36%
Apparent Relative Density	ND	Moisture Content	21.5%	% Passing #200	42.3%
Liquid Limit	44	Plastic Limit	14	Plastic Index	30


Soil Mortar (-#10 Sieve)

Coarse Sand	5%	Fine Sand	56%	Silt	3%	Clay	36%
-------------	----	-----------	-----	------	----	------	-----

Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>
---	---------	--------------------------	---------	--------------------------

Hard & Durable ☐ Soft ☐ Weathered & Friable ☐

References / Comments / Deviations: ND=Not Determined.

<u>Mal Krajan, ET</u> <i>Technician Name</i>	<u>104-01-0703</u> <i>Certification No.</i>	<u>Laboratory Manager</u> <i>Position</i>	<u>9/12/2016</u> <i>Date</i>
<u>Mal Krajan, ET</u> <i>Technical Responsibility</i>	 <i>Signature</i>	<u>Laboratory Manager</u> <i>Position</i>	<u>9/26/2016</u> <i>Date</i>

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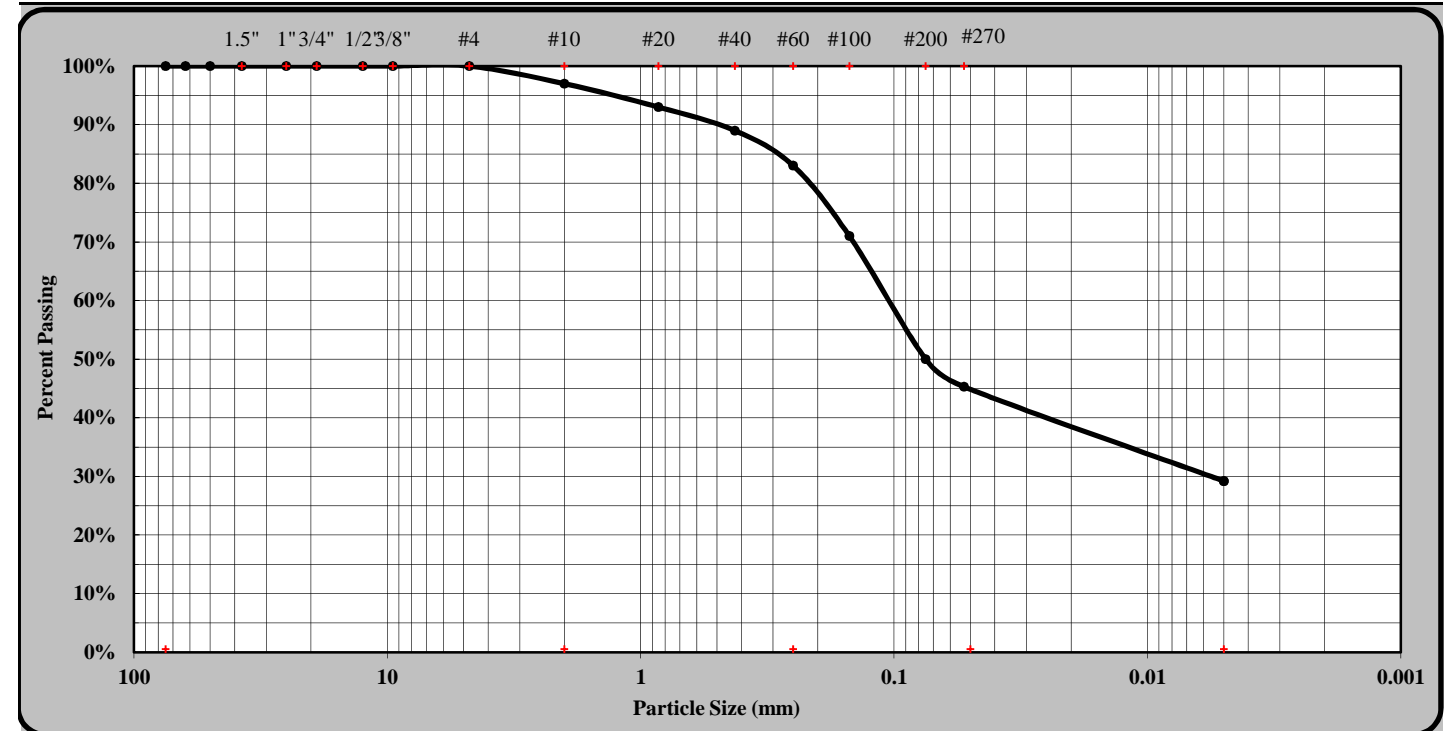
## Particle Size Analysis of Soils

*AASHTO T88 as Modified by NCDOT*



## Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616				
S&ME Project #:	6235-16-010		Report Date:	11/3/16
Project Name:	C.F. Harvey Parkway Extension R-5703		Test Date(s):	10/7 - 11/15/16
State Project #:	46375.1.1	F.A. Project No:	N/A	TIP NO: R-5703
Client Name:	Michael Baker Engineering			
Address:	Raleigh, NC			
Boring #:	Y8LPD-1717	Sample #:	SS-92	Sample Date: 9/20/16
Location:	17+17	Offset:	11' LT	Depth (ft): 2.5 - 4.0
Sample Description:	Gray Coarse to Fine Sandy Silty CLAY			A-6 (4)



As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm
Coarse Sand	< 2.00 mm and > 0.25 mm	Clay	< 0.005 mm

Maximum Particle Size	3/8"	Coarse Sand	14%	Silt	16%
Gravel	3%	Fine Sand	38%	Clay	29%
Apparent Relative Density	ND	Moisture Content	21.3%	% Passing #200	50.0%
Liquid Limit	31	Plastic Limit	15	Plastic Index	16


Soil Mortar (-#10 Sieve)
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Coarse Sand	14%	Fine Sand	39%	Silt	17%	Clay	30%
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Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>
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Hard & Durable ☐ Soft ☐ Weathered & Friable ☐

References / Comments / Deviations: ND=Not Determined.

<u>Mal Krajan, ET</u> <i>Technician Name</i>	<u>104-01-0703</u> <i>Certification No.</i>	<u>Laboratory Manager</u> <i>Position</i>	<u>11/3/2016</u> <i>Date</i>
<u>Mal Krajan, ET</u> <i>Technical Responsibility</i>	 <i>Signature</i>	<u>Laboratory Manager</u> <i>Position</i>	<u>9/26/2016</u> <i>Date</i>

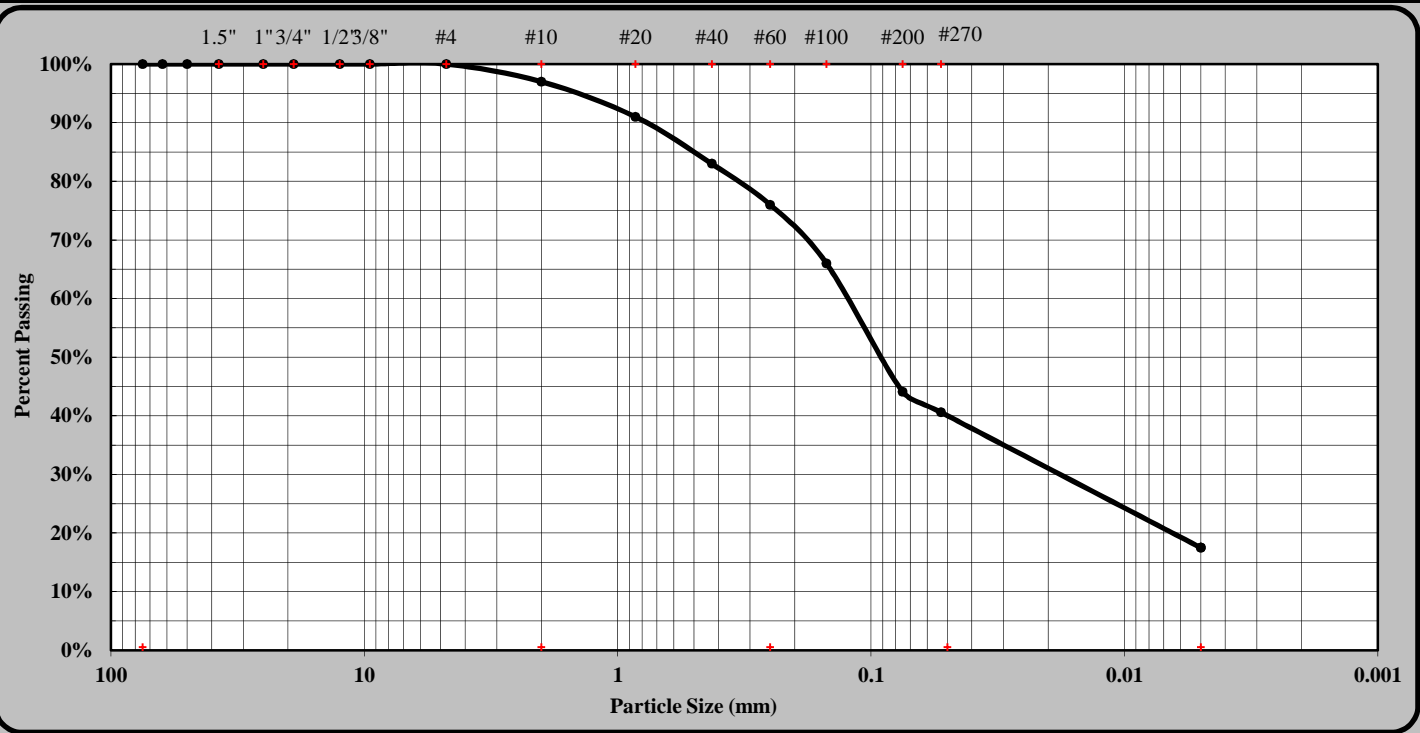
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/3/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 1/15/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	SERV1-2185	Sample #:	SS-103
Location:	21+85	Sample Date:	9/20/16
		Offset:	11' RT
		Depth (ft):	2.0 - 3.5
Sample Description:	Brown Coarse to Fine Sandy Clayey SILT A-4 (2)		

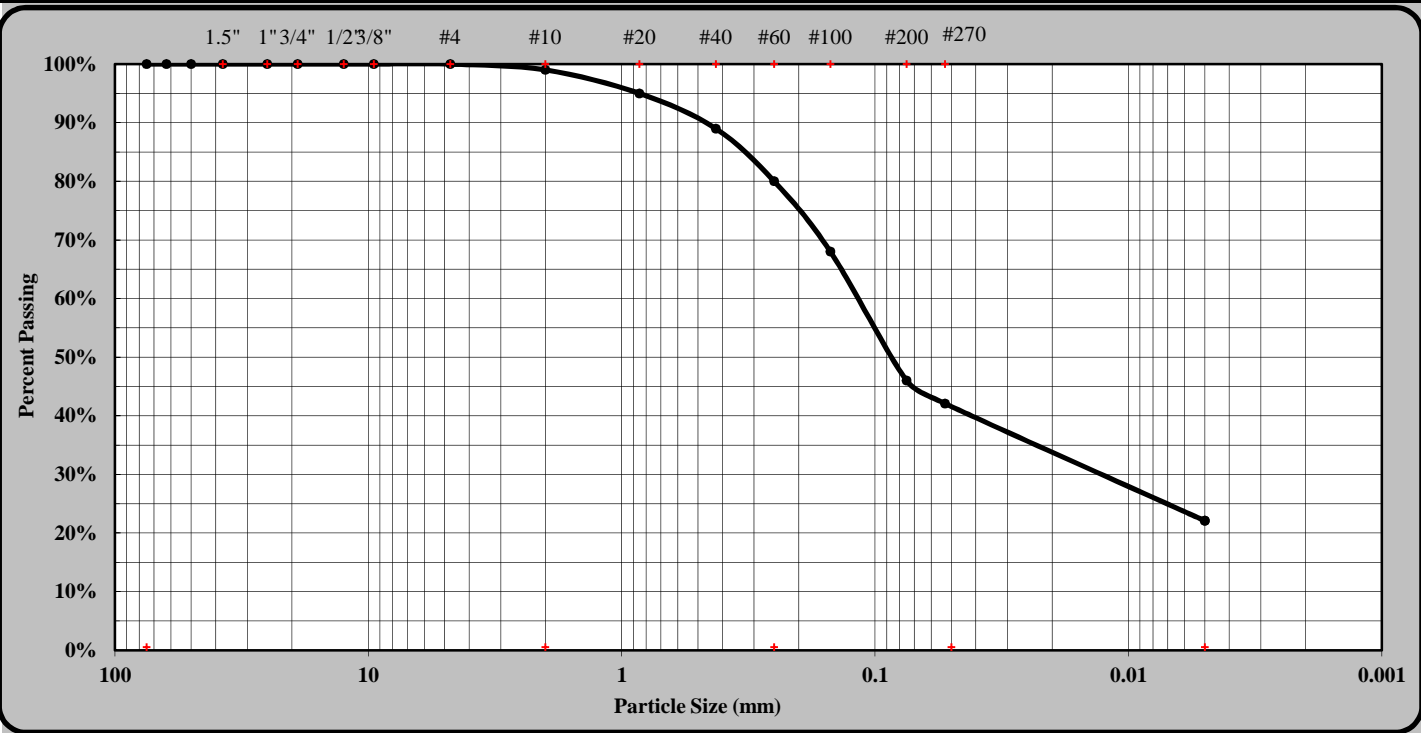


As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	#4	Coarse Sand	21%	Silt	23%
Gravel	3%	Fine Sand	35%	Clay	18%
Apparent Relative Density	ND	Moisture Content	36.0%	% Passing #200	44.1%
Liquid Limit	33	Plastic Limit	23	Plastic Index	10
Soil Mortar (-#10 Sieve)					
Coarse Sand	22%	Fine Sand	36%	Silt	24%
				Clay	18%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>	
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	11/3/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	9/26/2016
Technical Responsibility	Signature	Position	Date
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/3/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/15/16
State Project #:	46375.1.1	F.A. Project No:	N/A
Client Name:	Michael Baker Engineering	TIP NO:	R-5703
Address:	Raleigh, NC		
Boring #:	SERV1-3083	Sample #:	SS-104
Location:	30+83	Sample Date:	9/15/16
		Offset:	3' RT
		Depth (ft):	0.0 - 1.5
Sample Description:	Tan-Gray Coarse to Fine Sandy Clayey SILT A-4 (0)		



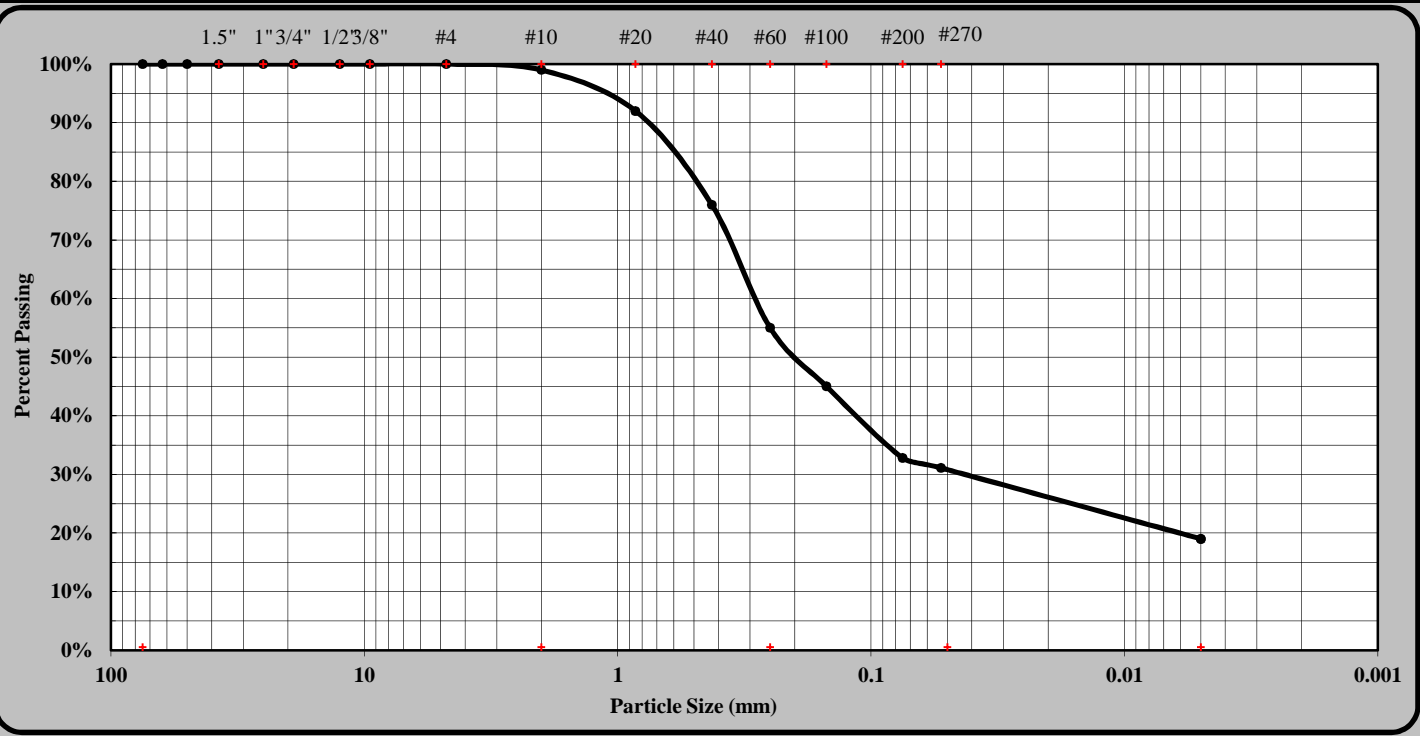
As Defined by NCDOT		Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm	Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm	Clay		< 0.005 mm	
Maximum Particle Size	3/8"	Coarse Sand	19%	Silt	20%
Gravel	1%	Fine Sand	38%	Clay	22%
Apparent Relative Density	ND	Moisture Content	16.3%	% Passing #200	46.0%
Liquid Limit	16	Plastic Limit	10	Plastic Index	6
Soil Mortar (-#10 Sieve)					
Coarse Sand	19%	Fine Sand	39%	Silt	20%
				Clay	22%
Description of Sand & Gravel Particles:	Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>	
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	11/3/2016
Technician Name	Certification No.	Position	Date
Mal Krajan, ET		Laboratory Manager	9/26/2016
Technical Responsibility	Signature	Position	Date
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S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-16-010	Report Date:	11/14/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/7 - 11/14/16
State Project #:	46375.1.1	F.A. Project No:	N/A
		TIP NO:	R-5703
Client Name:	Michael Baker Engineering		
Address:	Raleigh, NC		
Boring #:	SERV1-6083	Sample #:	SS-107
		Sample Date:	9/28/16
Location:	60+83	Offset:	1' RT
		Depth (ft):	4.0 - 5.5
Sample Description:	Gray Silty Clayey Fine to Coarse SAND A-2-6 (2)		



As Defined by NCDOT			Fine Sand		< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm and > 2.00 mm		Silt		< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm and >0.25 mm		Clay		< 0.005 mm	
Maximum Particle Size	#4	Coarse Sand	44%	Silt	12%	
Gravel	1%	Fine Sand	24%	Clay	19%	
Apparent Relative Density	ND	Moisture Content	17.2%	% Passing #200	32.8%	
Liquid Limit	39	Plastic Limit	13	Plastic Index	26	
Soil Mortar (-#10 Sieve)						
Coarse Sand	44%	Fine Sand	25%	Silt	12%	Clay 19%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular		<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable		<input type="checkbox"/>

References / Comments / Deviations: ND=Not Determined.

<u>Mal Krajan, ET</u> Technician Name	<u>104-01-0703</u> Certification No.	<u>Laboratory Manager</u> Position	<u>10/7/2016</u> Date
<u>Mal Krajan, ET</u> Technical Responsibility	 Signature	<u>Laboratory Manager</u> Position	<u>11/14/2016</u> Date

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